




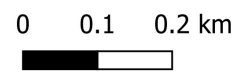




Habitats

-  Site Boundary
-  Amenity Grassland GA2
-  Dry Meadows and Grassy Verges
x Hedgerow x Treeline
GS2 x WL1 x WL2
-  Scattered Trees and Parkland WD5
-  Buildings and Artificial Surfaces BL3

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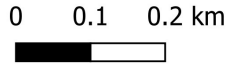
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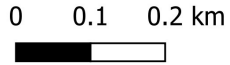
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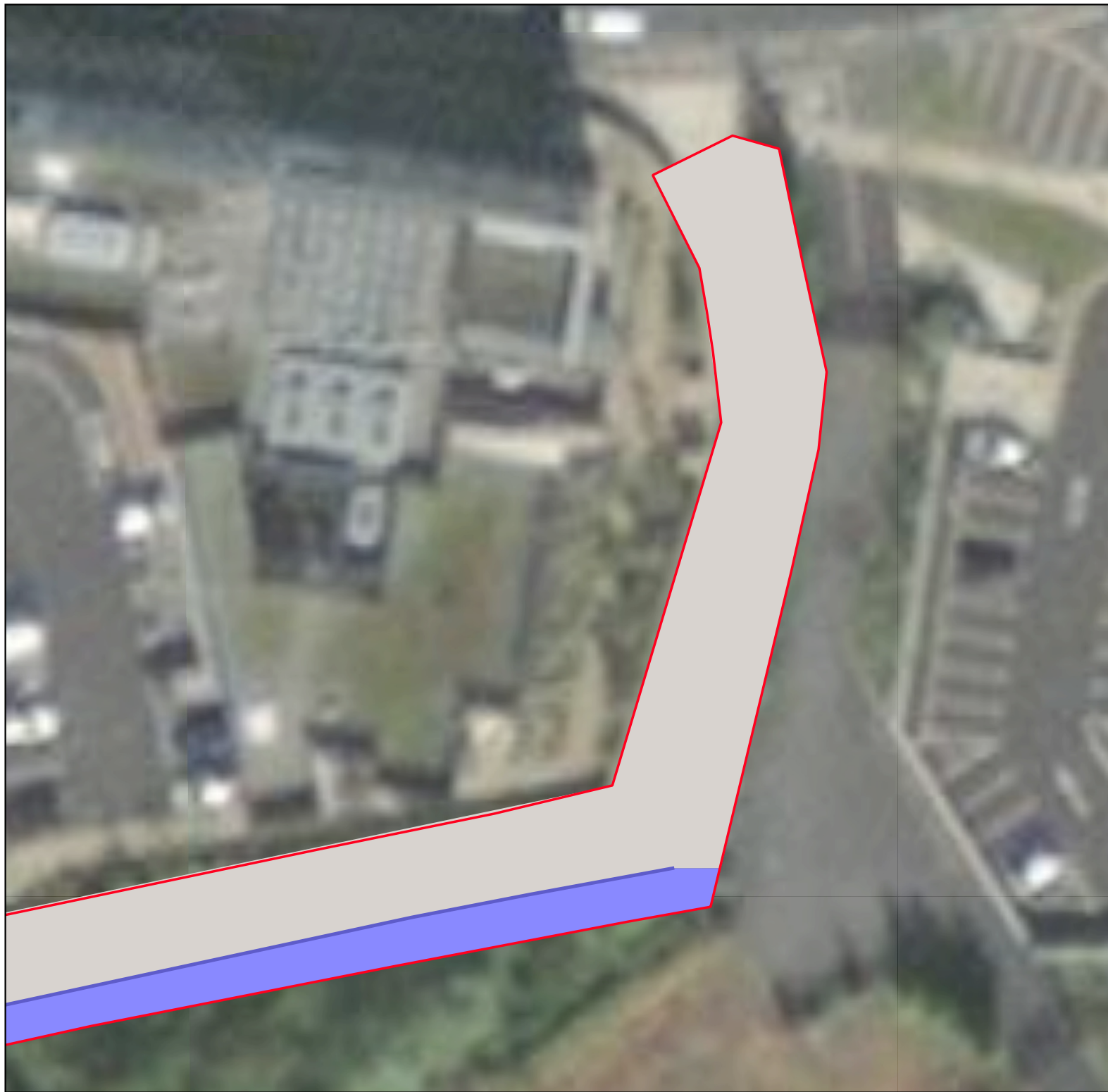
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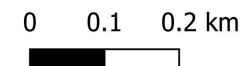
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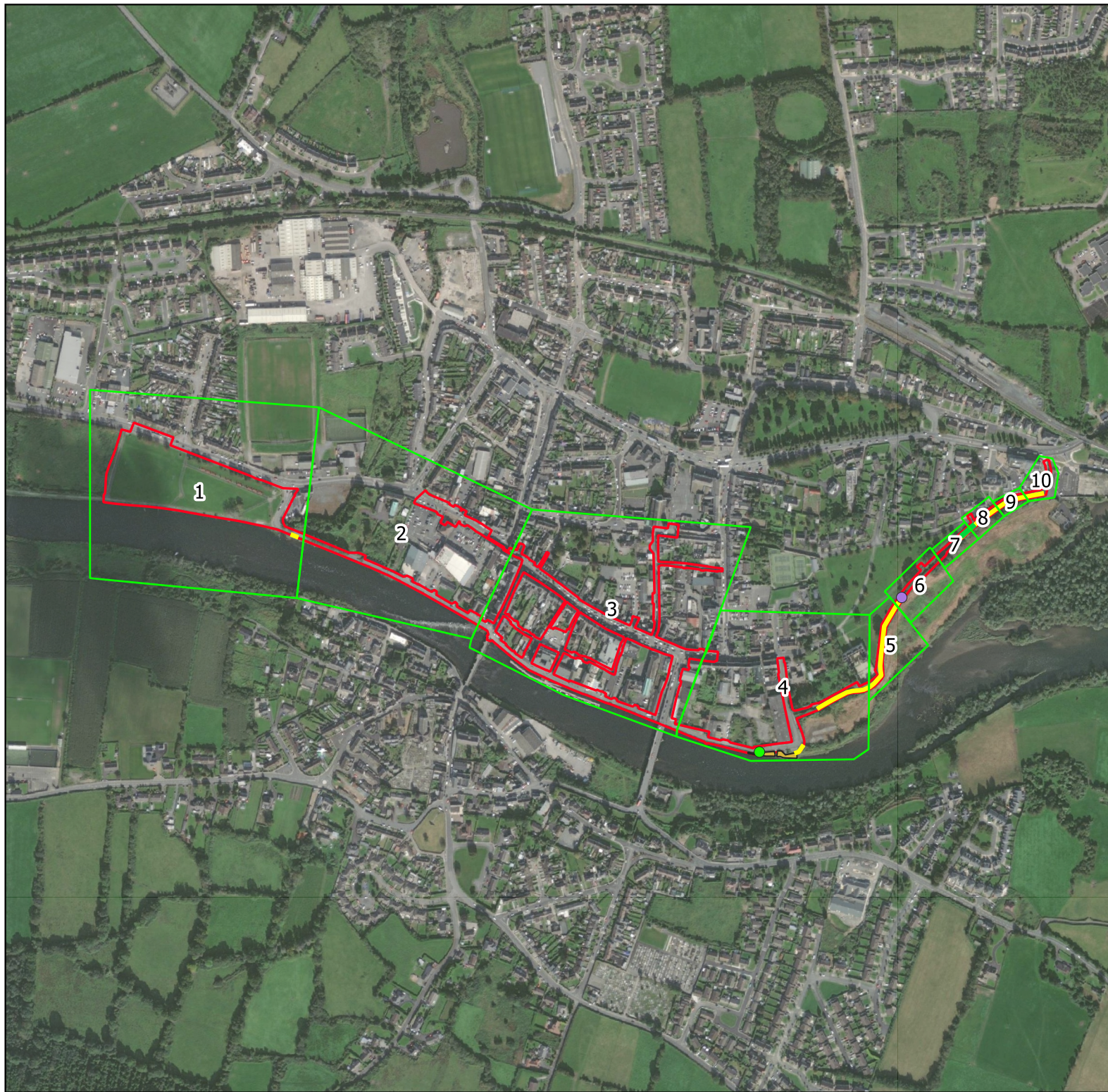
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Appendix 3

Invasive Species Maps



Habitats

- Site Boundary
- Himalayan Balsam (area)
- Japanese Knotweed (line)
- Japanese Knotweed (points)
- Clematis 'Old man's beard' (line)
- Winter heliotrope

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0 0.1 0.2 km



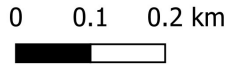
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Habitats

- Site Boundary
- Japanese Knotweed (line)

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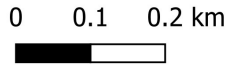
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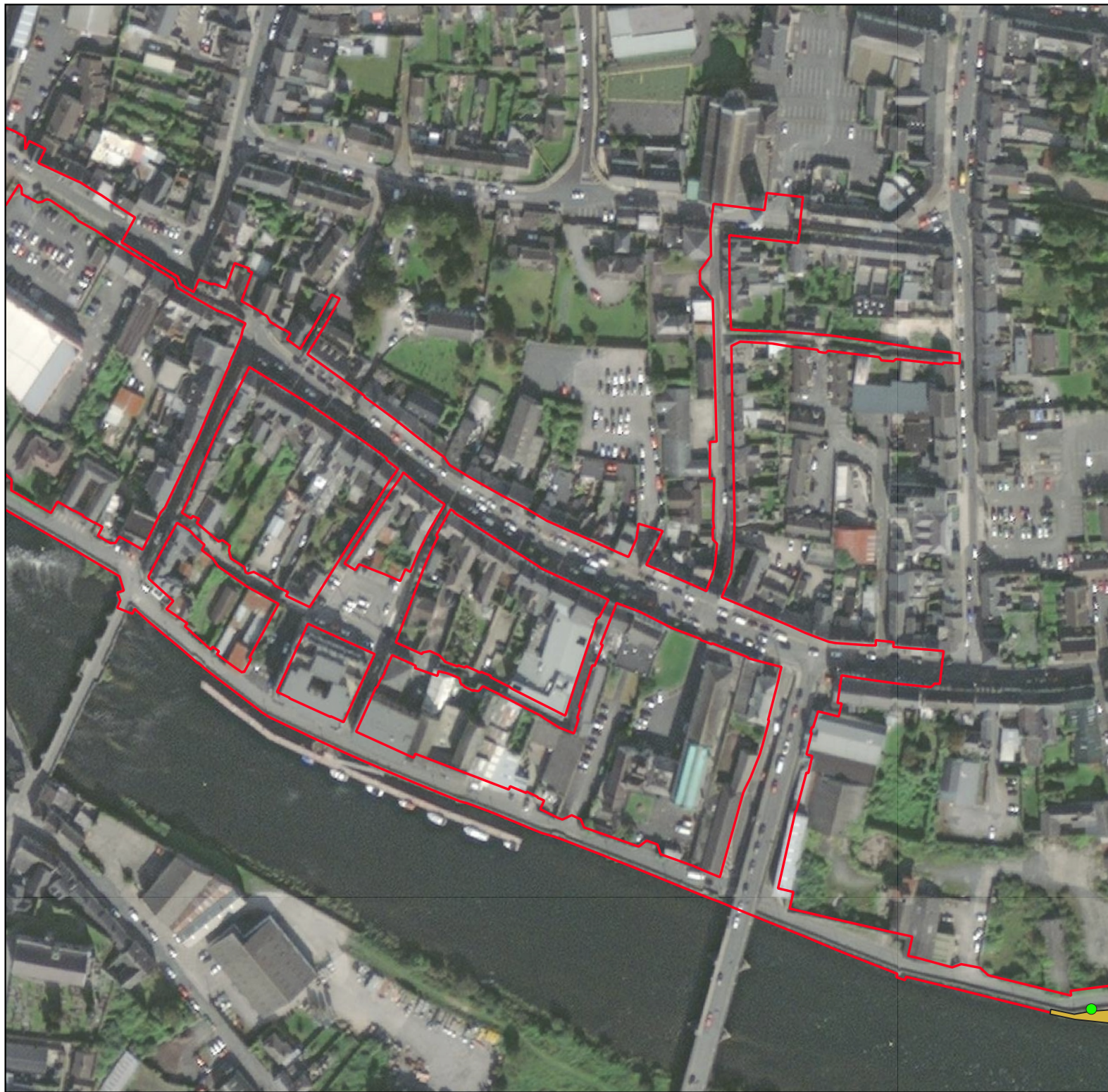
Habitats

- Site Boundary
- Japanese Knotweed (line)

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Habitats

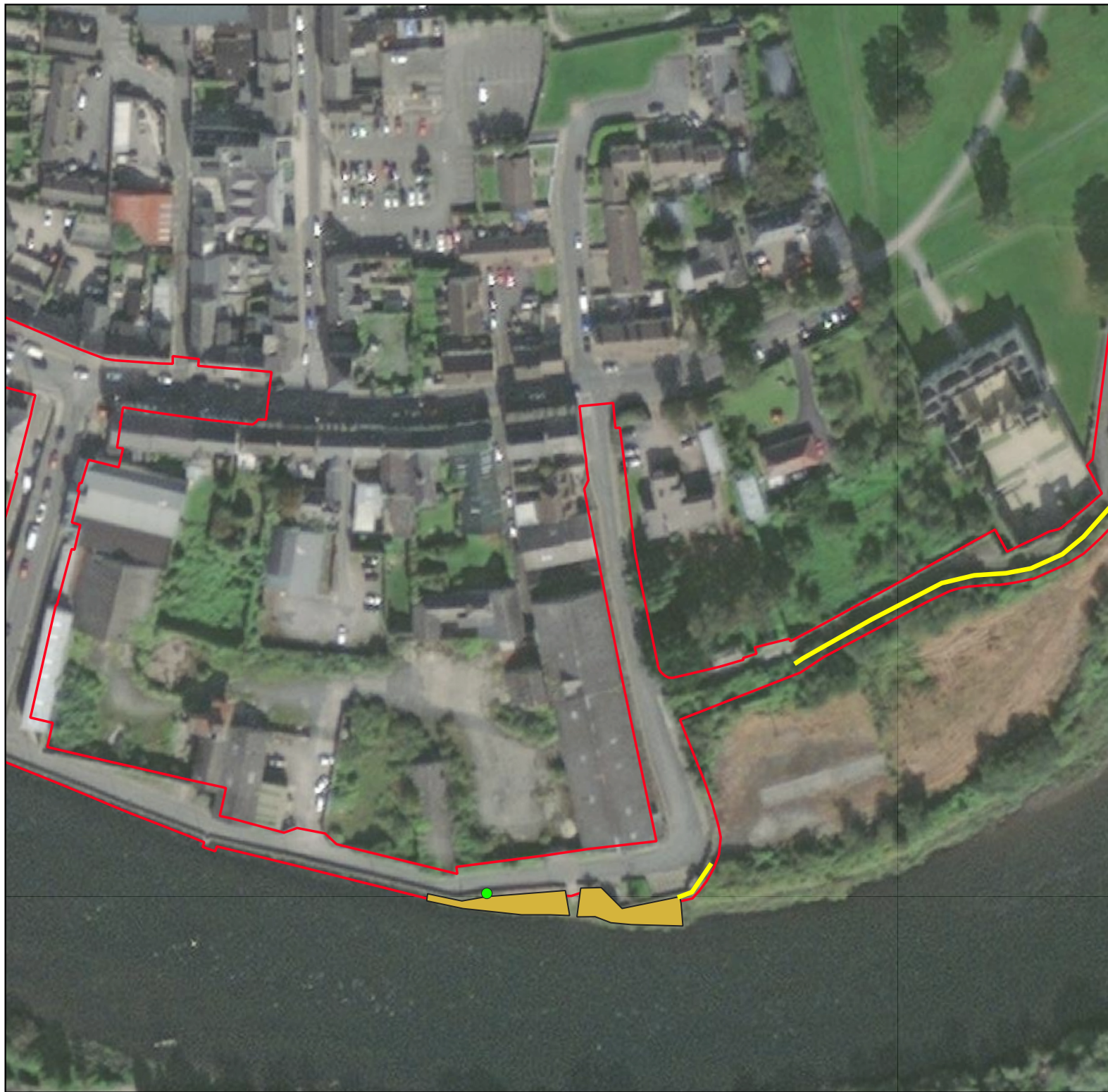
- Site Boundary
- Himalayan Balsam (area)
- Japanese Knotweed (points)

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0 0.1 0.2 km



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Habitats

- Site Boundary
- Himalayan Balsam (area)
- Japanese Knotweed (line)
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0 0.1 0.2 km



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Habitats

- Site Boundary
- Japanese Knotweed (line)
- Winter heliotrope

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0 0.1 0.2 km



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Habitats

- Site Boundary
- Japanese Knotweed (line)
- Winter heliotrope

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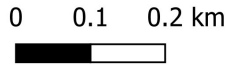
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Habitats

- Site Boundary
- Japanese Knotweed (line)
- Clematis 'Old man's beard' (line)

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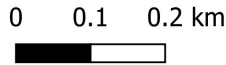
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Habitats

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- Japanese Knotweed (line)
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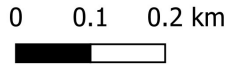
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Habitats

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- Japanese Knotweed (line)

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Habitats

— Site Boundary

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0 0.1 0.2 km



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Appendix 4

Site Synopses

Site Name: Hugginstown Fen SAC

Site Code: 000404

Hugginstown Fen is situated approximately 4 km south-west of Ballyhale, Co. Kilkenny. The site consists of a relatively large, isolated area of swamp and floating fen developed in a small valley in hilly country. It is underlain by limestone glacial till overlying and surrounded by acid Old Red Sandstone. The catchment is relatively small and iron-rich springs are an important source of water for the wetland.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[7230] Alkaline Fens

The northern third of the fen is dominated by Common Reed (*Phragmites australis*) swamps, with some small areas of open water near springs. The remainder of the site consists of species-rich fen, partly developed on mats of floating vegetation, dominated by a tall herb community in which Meadowsweet (*Filipendula ulmaria*), Wild Angelica (*Angelica sylvestris*), Water Horsetail (*Equisetum fluviatile*), Bulrush (*Typha latifolia*), Water Mint (*Mentha aquatica*) and Lesser Tussock-sedge (*Carex diandra*) are common. Other species present include Nodding Bur-marigold (*Bidens cernua*), Marsh St. John's-wort (*Hypericum elodes*), Black Bog-rush (*Schoenus nigricans*) and Tubular Water-dropwort (*Oenanthe fistulosa*).

Species-rich rush/Purple Moor-grass (Junco-Molinion) grassland occurs in drained areas at the southern and northern end and around the margins at the peat-mineral interface. Small clumps of willow (*Salix* spp.) occur occasionally on the fen margin. An interesting feature of this area is that the water flows overground initially then disappears abruptly underneath the floating fen vegetation.

Two uncommon insect species recorded from Hugginstown Fen are Scarce Emerald Damselfly (*Lestes dryas*) and the Hoverfly *Parhelophis consimilis*. The Common Frog, a Red Data Book species, is frequent at the site.

Although this site has been damaged to some extent by drainage, especially in the southern part, it contains an important example of an alkaline fen, a habitat listed on Annex I of the E.U. Habitats Directive and remains one of the most interesting and diverse fen sites in Ireland.



Site Name: Comeragh Mountains SAC

Site Code: 001952

The Comeragh Mountains are situated approximately 11 km south-west of Carrick-on-Suir in Co. Waterford. They consist of a plateau of Old Red Sandstone with its edges deeply scarred by recent glaciation. Corries and deep valleys are cut into the eastern and western sides leaving a central ridge with a width reduced to 270 m at its narrowest point. The rocks, which are horizontally-bedded, stand out as a series of terraces around these corries, which often house small mountain lakes such as Coumshingaun, the Sgilloge Loughs, the Coum Iarthar Loughs and Crotty's Lough.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- [3110] Oligotrophic Waters containing very few minerals
- [3260] Floating River Vegetation
- [4010] Wet Heath
- [4030] Dry Heath
- [4060] Alpine and Subalpine Heaths
- [7130] Blanket Bogs (Active)*
- [8110] Siliceous Scree
- [8210] Calcareous Rocky Slopes
- [8220] Siliceous Rocky Slopes
- [1393] Slender Green Feather-moss (*Drepanocladus vernicosus*)

The central plateau of the Comeragh Mountains is at an altitude of about 700 m and supports areas of blanket bog. The peat is up to 2 m deep in places and is rich in cottongrasses (*Eriophorum angustifolium* and *E. vaginatum*), Deergrass (*Scirpus cespitosus*), Heather (*Calluna vulgaris*), Crowberry (*Empetrum nigrum*) and mosses (*Sphagnum* spp., *Polytrichum* spp.). North of Coummahon, the blanket bog has suffered from erosion, in many places down to the underlying bedrock. Eroding channels, hummocks and flats of loose peat are also present.

Dry heath is found at this site in a number of forms. A form dominated by Heather is found on rocky terrain at the south of the site, and is considered good quality dry heath. At the east and south-east of the site the vegetation is found in mosaic with Bracken (*Pteridium aquilinum*), upland grassland (grasses such as *Agrostis* spp. and *Festuca* spp. are common) and Gorse (*Ulex europaeus*). Here the habitat is sometimes associated with moraines, an interesting and uncommon feature. However, the

Heather element is much reduced in this area due to sheep grazing pressure. Grassland and heath also occur at the west of the site, but grassland is more common here and is probably encroaching due to over-grazing.

A form of wet heath which is dominated by Deergrass, in association with Heath Rush (*Juncus squarrosus*), Mat-grass (*Nardus stricta*), Bell Heather, Bilberry, Tormentil and wood-rushes (*Luzula* spp.) occurs in mosaic with eroding blanket peat.

Alpine heath has been documented as occurring in the corries associated with the Sgilloge and Coumshingaun Loughs, and species records indicate a diverse flora. The habitat occurs in patches in mosaic with the vegetation of siliceous rocks and screes, narrow calcareous rock bands, upland grassland and other heath types on the cliffs. The cliff flora contains many mountain species, including several for which this is their only station in Waterford. St. Patrick's-cabbage (*Saxifraga spathularis*) grows at Coumshingaun, where there are also records for uncommon species such as Mossy Saxifrage (*Saxifraga hypnoides*), Dwarf Willow (*Salix herbacea*), Cowberry (*Vaccinium vitis-idaea*), Roseroot (*Rhodiola rosea*) and the ferns, *Hymenophyllum wilsonii* and *Cystopteris fragilis*. The mountain/rocky slope flora also includes a number of rare and threatened bryophyte species including *Antitrichia curtispindula*, *Grimmia muehlenbeckii*, *Tortella bambergeri*, *Cynodontium bruntonii*, *Plagiothecium platyphyllum* and *Sphagnum skyense*.

Coumshingaun Lough, which is located on the eastern slope, is an excellent example of an ultra-oligotrophic lake. Unlike most corrie lakes the water is exceptionally clear. It contains a stonewort, *Nitella flexilis*, and also Bog Pondweed (*Potamogeton polygonifolius*), but only down to the relatively shallow depth of 5 m. Slender Green Feather-moss (*Drepanocladus vernicosus*), a species listed on Annex II off the E.U. Habitats Directive, has been recorded at Sgilloge Loughs and two other localities in the mountains.

Water-crowfoots (*Ranunculus* spp.) are known to occur in at least some of the many upland rivers in this site, and particularly those to the east. There is an unusual and interesting chemistry associated with the rivers which exit the corrie lakes.

Peregrine, a species listed on Annex I of the E.U. Birds Directive, breeds within the site, as does Raven. Hen Harrier, also listed on this Annex, is found on the site, as is Irish Hare, a Red Data Book species. Arctic Char has been recorded from the Comeragh Lakes, though not since 1930. This species is listed in the Red Data Book as threatened in Ireland.

The integrity of the remaining areas of blanket bog and the general habitat diversity of the site are under threat from land use pressures such as grazing, burning, afforestation and leisure activities.

This large site has a diverse range of habitats, including blanket bog, heath, upland grassland, scree, exposed rock, lakes and streams. The blanket bog represents the south-eastern extremity of the range of this habitat type in Ireland. There are many

corries, most of which have associated oligotrophic lakes. Overall this site is of considerable conservation importance.



Site Name: Lower River Suir SAC

Site Code: 002137

Lower River Suir SAC consists of the freshwater stretches of the River Suir immediately south of Thurles, the tidal stretches as far as the confluence with the Barrow/Nore immediately east of Cheekpoint in Co. Waterford, and many tributaries including the Clodiagh in Co. Waterford, the Lingaun, Anner, Nier, Tar, Aherlow, Multeen and Clodiagh in Co. Tipperary. The Suir and its tributaries flow through the counties of Tipperary, Kilkenny and Waterford.

Upstream of Waterford city, the swinging meanders of the Suir criss-cross the Devonian sandstone rim of hard rocks no less than three times as they leave the limestone-floored downfold below Carrick-on-Suir. In the vicinity of Carrick-on-Suir the river follows the limestone floor of the Carrick Syncline. Upstream of Clonmel the river and its tributaries traverse Upper Palaeozoic Rocks, mainly the Lower Carboniferous Viséan and Tournaisian. The freshwater stretches of the Clodiagh River in Co. Waterford traverse Silurian rocks, through narrow bands of Old Red Sandstone and Lower Avonian Shales, before reaching the carboniferous limestone close to its confluence with the Suir. The Aherlow River flows through a Carboniferous limestone valley, with outcrops of Old Red Sandstone forming the Galtee Mountains to the south and the Slievenamuck range to the north. Glacial deposits of sands and gravels are common along the valley bottom, flanking the present-day river course.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- [1330] Atlantic Salt Meadows
- [1410] Mediterranean Salt Meadows
- [3260] Floating River Vegetation
- [6430] Hydrophilous Tall Herb Communities
- [91A0] Old Oak Woodlands
- [91E0] Alluvial Forests*
- [91J0] Yew Woodlands*

- [1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)
- [1092] White-clawed Crayfish (*Austropotamobius pallipes*)
- [1095] Sea Lamprey (*Petromyzon marinus*)
- [1096] Brook Lamprey (*Lampetra planeri*)
- [1099] River Lamprey (*Lampetra fluviatilis*)

[1103] Twaite Shad (<i>Alosa fallax</i>)
[1106] Atlantic Salmon (<i>Salmo salar</i>)
[1355] Otter (<i>Lutra lutra</i>)

Alluvial wet woodland is a declining habitat type in Europe as a result of drainage and reclamation. The best examples of this type of woodland in the site are found on the islands just below Carrick-on-Suir and at Fiddown Island. Species occurring here include Almond Willow (*Salix triandra*), White Willow (*S. alba*), Rusty Willow (*S. cinerea* subsp. *oleifolia*), Osier (*S. viminalis*), with Yellow Iris (*Iris pseudacorus*), Hemlock Water-dropwort (*Oenanthe crocata*), Wild Angelica (*Angelica sylvestris*), Pendulous Sedge (*Carex pendula*), Meadowsweet (*Filipendula ulmaria*) and Common Valerian (*Valeriana officinalis*). The terrain is littered with dead trunks and branches and intersected with small channels which carry small streams to the river. The bryophyte and lichen floras appear to be rich. A small plot is currently being coppiced and managed by the National Parks and Wildlife Service. In the drier areas species such as Ash (*Fraxinus excelsior*), Hazel (*Corylus avellana*), Hawthorn (*Crataegus monogyna*) and Blackthorn (*Prunus spinosa*) occur.

Eutrophic tall herb vegetation occurs in association with the various areas of alluvial forest and elsewhere where the floodplain of the river is intact. Characteristic species of the habitat include Meadowsweet, Purple Loosestrife (*Lythrum salicaria*), Marsh Ragwort (*Senecio aquaticus*), Ground Ivy (*Glechoma hederacea*) and Hedge Bindweed (*Calystegia sepium*).

Old oak woodlands are also of importance at the site. The best examples are seen in Portlaw Wood which lies on both sides of the Clodiagh River. On the south-facing side the stand is more open and the oaks (mainly Pedunculate Oak, *Quercus robur*) are well grown and spreading. Ivy (*Hedera helix*) and Bramble (*Rubus fruticosus* agg.) are common on the ground, indicating relatively high light conditions. Oak regeneration is dense, varying in age from 0-40 years and Holly (*Ilex aquifolium*) is fairly common but mostly quite young. Across the valley, by contrast, the trees are much more closely spaced and though taller, are poorly grown on average. There are no clearings; large oaks extend to the boundary wall. In the darker conditions, Ivy is much rarer and Holly much more frequent, forming a closed canopy in places. Oak regeneration is uncommon since there are as yet few natural clearings. The shallowness of the soil on the north-facing slope probably contributes to the poor tree growth there. The acid nature of the substrate has induced a 'mountain' type oakwood community to develop. The site is quite species-rich throughout, including an abundance of mosses, liverworts and lichens. The rare lichen *Lobaria pulmonaria*, an indicator of ancient woodlands, is found here.

Inchinquilib Wood consists of three small separate sloping blocks of woodland in a valley cut by the young Miltien River and its tributaries through acidic Old Red Sandstone and Silurian rocks. Two blocks, both with an eastern aspect, located to the north of the road, are predominantly of Sessile Oak (*Quercus petraea*) and Hazel, with Downy Birch (*Betula pubescens*), Ash and Holly. The ground flora is quite mixed with,

for example, Wood-sedge (*Carex sylvatica*), Bluebell (*Hyacinthoides non-scripta*), Primrose (*Primula vulgaris*), Wood-sorrel (*Oxalis acetosella*), Pignut (*Conopodium majus*) and Hard Fern (*Blechnum spicant*). The base poor nature of the underlying rock is to some extent masked by the overlying drift. The third block, to the south of the road, and with a northern aspect, is a similar although less mature mixture of Sessile Oak, Birch and Holly. Here the influence of the drift is more marked, with the occurrence of Wood Anemone (*Anemone nemorosa*) amongst the ground flora.

Two stands of Yew (*Taxus baccata*) woods, a rare habitat in Ireland and the E.U., occur within the site. These are on limestone ridges at Shanbally and Cahir Park. Both are in woods planted with non-native species, including conifers. However, the area at Cahir Park is fairly substantial in size and includes some relatively undisturbed patches of wood and some very old trees. Regeneration of the Yew trees is mostly poor, due to competition from species such as Sycamore (*Acer pseudoplatanus*) and, at Shanbally, due to heavy grazing by goats. Other native species which occur with the Yew trees include Ash, Pedunculate Oak, Hazel and Spindle (*Euonymus europaeus*). Future prospects for these Yew woods are good as the sites are proposed for restoration under a Coillte E.U. LIFE programme.

Floating river vegetation is evident in the freshwater stretches of the River Suir and along many of its tributaries. Typical species found include Canadian Pondweed (*Elodea canadensis*), water-milfoils (*Myriophyllum* spp.), Fennel Pondweed (*Potamogeton pectinatus*), Curled Pondweed (*P. crispus*), Perfoliate Pondweed (*P. perfoliatus*), Pond Water-crowfoot (*Ranunculus peltatus*), other crowfoots (*Ranunculus* spp.) and the moss *Fontinalis antipyretica*. At a couple of locations along the river Opposite-leaved Pondweed (*Groenlandia densa*) occurs. This species is protected under the Flora (Protection) Order, 1999.

The Aherlow River is fast flowing and mostly follows a natural unmodified river channel. Submerged vegetation includes the aquatic moss *Fontinalis antipyretica* and Stream Water-crowfoot (*R. pencillatus*), while shallow areas support species such as Reed Canary-grass (*Phalaris arundinacea*), Brooklime (*Veronica beccabunga*) and Water Mint (*Mentha aquatica*). The river bank is fringed in places with Alder (*Alnus glutinosa*) and willows (*Salix* spp.).

The Multeen River is fast flowing, mostly gravel-bottomed and appears to follow a natural unmodified river channel. Water-crowfoots occur in abundance and the aquatic moss *Fontinalis antipyretica* is also common. In sheltered shallows, species such as Water-cress (*Nasturtium officinale*) and water-starworts (*Callitriche* spp.) occur. The river channel is fringed for most of its length with Alder, Willow and a narrow strip of marshy vegetation.

Salt meadows occur below Waterford City in old meadows where the embankment is absent, or has been breached, and along the tidal stretches of some of the in-flowing rivers below Little Island. There are very narrow, non-continuous bands of this habitat along both banks. More extensive areas are also seen along the south bank at Ballynakill, the east side of Little Island, and in three large salt meadows

between Ballynakill and Cheekpoint. The Atlantic and Mediterranean sub-types are generally intermixed. The species list is extensive and includes Red Fescue (*Festuca rubra*), oraches (*Atriplex* spp.), Sea Aster (*Aster tripolium*), Sea Couch (*Elymus pycnanthus*), frequent Sea Milkwort (*Glaux maritima*), occasional Wild Celery (*Apium graveolens*), Parsley Water-dropwort (*Oenanthe lachenalii*), English Scurvygrass (*Cochlearia anglica*) and Sea Arrowgrass (*Triglochin maritima*). These species are more representative of the Atlantic sub-type of the habitat. Common Cord-grass (*Spartina anglica*), is rather frequent along the main channel edge and up the internal channels. The legally protected (Flora (Protection) Order, 1999) Meadow Barley (*Hordeum secalinum*) grows at the landward transition of the saltmarsh. Sea Rush (*Juncus maritimus*), an indicator of the Mediterranean salt meadows, also occurs.

Other habitats at the site include wet and dry grassland, marsh, reedswamp, improved grassland, coniferous plantations, deciduous woodland, scrub, tidal river, stony shore and mudflats. The most dominant habitat adjoining the river is improved grassland, although there are wet fields with species such as Yellow Iris, Meadowsweet, rushes (*Juncus* spp.), Meadow Buttercup (*Ranunculus acris*) and Cuckooflower (*Cardamine pratensis*).

Cabragh marshes, just below Thurles, lie in a low-lying tributary valley into which the main river floods in winter. Here there is an extensive area of Common Reed (*Phragmites australis*) with associated marshland and peaty fen. The transition between vegetation types is often well displayed. A number of wetland plants of interest occur, in particular the Narrow-leaved Bulrush (*Typha angustifolia*), Bottle Sedge (*Carex rostrata*) and Blunt-flowered Rush (*Juncus subnodulosus*). The marsh is naturally eutrophic but it has also the nutritional legacy of the former sugar factory which discharged into it through a number of holding lagoons, now removed. Production is high, which is seen in the size of such species as Celery-leaved Buttercup (*Ranunculus sceleratus*), as well as in the reeds themselves.

Throughout the Lower River Suir site are small areas of woodland other than those described above. These tend to be a mixture of native and non-native species, although there are some areas of semi-natural wet woodland with species such as Ash and willow. Cahir Park Woodlands is a narrow tract of mixed deciduous woodland lying on the flat-lying floodplain of the River Suir. This estate woodland was planted over one hundred years ago and it contains a large component of exotic tree species. However, due to original planting and natural regeneration there is now a good mix of native and exotic species. About 5 km north-west of Cashel, Ardmayle pond is a long, possibly artificial water body running parallel to the River Suir. It is partly shaded by planted Lime (*Tilia* hybrids), Sycamore and the native Alder. Growing beneath the trees are shade tolerant species such as Remote sedge (*Carex remota*).

The site is of particular conservation interest for the presence of a number of Annex II animal species, including Freshwater Pearl Mussel (both *Margaritifera margaritifera* and *M. margaritifera* subsp. *durrovensis* occur), White-clawed Crayfish, Salmon, Twaite Shad (*Alosa fallax fallax*), three species of Lampreys - Sea Lamprey, Brook

Lamprey and River Lamprey, and Otter. This is one of only three known spawning grounds in the country for Twaite Shad.

The site also supports populations of several other animal species. Those which are listed in the Irish Red Data Book include Daubenton's Bat, Natterer's Bat, Pipistrelle Bat, Pine Marten, Badger, Irish Hare, Smelt and Common Frog. Breeding stocks of Carp are found in Kilsheelan Lake. This is one of only two lakes in the country which is known to have supported breeding Carp. Carp require unusually high summer water temperatures to breed in Ireland. As the site is therefore unusual in this regard, it may also support interesting invertebrate populations.

Parts of the site have also been identified as of ornithological importance for a number of Annex I (E.U. Birds Directive) bird species, including Greenland White-fronted Goose (10), Golden Plover (1,490), Whooper Swan (7) and Kingfisher. Figures given in brackets are the average maximum counts from four count areas within the site for the three winters 1994-1997. Wintering populations of migratory birds use the site. Flocks are seen in Coolfinn Marsh and also along the reedbeds and saltmarsh areas of the Suir. Coolfinn supports nationally important numbers of Greylag Goose on a regular basis, with numbers between 600 and 700 recorded. Other species occurring include Mallard (21), Teal (159), Wigeon (26), Tufted Duck (60), Pintail (4), Pochard (2), Little Grebe (2), Black-tailed Godwit (20), Oystercatcher (16), Lapwing (993), Dunlin (101), Curlew (195), Redshank (28), Greenshank (4) and Green Sandpiper (1). Nationally important numbers of Lapwing (2,750) were recorded at Faithlegg in the winter of 1996/97. In Cabragh marshes there is abundant food for surface feeding wildfowl which total approximately 1,000 in winter. Widgeon, Teal and Mallard are numerous, and the latter has a large breeding population, with up to 400 in summer. In addition, less frequent species like Shoveler and Pintail occur and there are records for both Whooper and Bewick's swans. Kingfisher, a species that is listed on Annex I of the E.U. Birds Directive, occurs along some of the many tributaries throughout the site.

Land use at the site consists mainly of agricultural activities including grazing, silage production, fertilising and land reclamation. The grassland is intensively managed and the rivers are therefore vulnerable to pollution from run-off of fertilisers and slurry. Arable crops are also grown. Fishing is a main tourist attraction on stretches of the Suir and some of its tributaries, and there are a number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. Both commercial and leisure fishing takes place on the rivers. The Aherlow River is a designated Salmonid Water under the E.U. Freshwater Fish Directive. Other recreational activities such as boating, golfing and walking are also popular. Several industrial developments, which discharge into the river, border the site including three dairy related operations and a tannery.

The Lower River Suir contains excellent examples of a number of Annex I habitats, including the priority habitats alluvial forest and Yew woodland. The site also supports populations of several important animal species, some listed on Annex II of the Habitats Directive or listed in the Irish Red Data Book. The presence of two

legally protected plants (Flora (Protection) Order, 1999) and the ornithological importance of the site adds further to the ecological interest and importance.

Appendix 5

Finding of No Significant Effects Report

FINDING OF NO SIGNIFICANT EFFECTS MATRIX	
European Site	Proximity of subject site to nearest point of designated site (km)
Name of project or plan	Carrick-on-Suir Regeneration Plan
Name and location of Natura 2000 site	Lower River Suir SAC – 0km Comeragh Mountains SAC – 10.7km Hugginstown Fen SAC – 14.2km
Description of the project	The Carrick-on-Suir Regeneration Plan aims to regenerate Carrick-on-Suir through investment in orientation and public realm enhancement. The proposed regeneration plan will form a linkage between the Suir Blueway to the west and the Ormond Castle Quarter to the east. The scheme develops pedestrian pathways and streetscapes within the town and cycleway along the river.
Is the project or plan directly connected with or necessary to the management of the site?	No
Are there other projects or plans that together with the project or plan being assessed could affect the site	No
THE ASSESSMENT OF SIGNIFICANCE OF EFFECTS	
Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site(s).	No impact is envisaged as a result of the proposed works.
List of agencies consulted: provide contact name and telephone or e- mail address.	N/A
Response to consultation.	N/A
DATA COLLECTED TO CARRY OUT THE ASSESSMENT	
Who carried out the assessment?	<ul style="list-style-type: none"> Fergus Doyle, Environmental Scientist with Malachy Walsh and Partners Sinéad Clifford, Ecologist with Malachy Walsh and Partners
Sources of data	Refer to references.
Level of assessment completed	Desktop study and Field Study



Appendix C

Flood Risk Assessment Report

MWP

**CARRICK-ON-SUIR REGENERATION
PLAN**
Flood Risk Assessment

Tipperary County Council

July 2021

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Project No.	Doc. No.	Rev.	Date	Prepared By	Checked By	Approved By	Status
21906	21906-6013	A	July 2021	M. Fenton			Planning
21906	21906-6013	B	July 2021	M.Fenton			Planning

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Glossary of Acronyms and Terms

AEP	Annual Exceedance Probability
DEFRA	Department for Environment, Food and Rural Affairs
DTM	Digital Terrain Model
EPA	Environmental Protection Agency
FFL	Finished Floor Level
FRA	Flood Risk Assessment
FSR	Flood Studies Report
FSU	Flood Studies Update
GSDSDS	Greater Dublin Strategic Drainage Study
HEP	Hydrological Estimation Point
HEFS	High End Future Scenario
CFRAMS	Catchment Flood Risk Assessment and Management Study
mOD	Metres Above Ordnance Datum
MRFS	Mid Range Future Scenario
MWP	Malachy Walsh & Partners
OPW	Office of Public Works
PSFRM	The Planning System and Flood Risk Management Guidelines, November 2009
SuD	Sustainable Urban Drainage Systems

1. General

1.1 Introduction & Background

This Flood Risk Assessment (FRA) report has been prepared on behalf of Tipperary County Council in support of a Part VIII planning application for the Carrick-on-Suir Regeneration Plan, County Tipperary.

1.2 Overview of the Proposed Scheme

The proposed development includes for public realm refurbishment and enhancement in Carrick on Suir's town centre comprising the upgrading of existing streets and lanes with new high quality paving, kerbing, public lighting, improved street furniture and utility diversions/works (including undergrounding of overhead ESB cables). Footpath space will be widened, traffic calming will be developed through build out, reduced road carriage widths and improved pedestrian crossings. Existing car parks will be improved and new car parking spaces provided. The traffic management at the junction of Main St and Dillon Bridge will change from a signal controlled junction to a priority controlled junction. Pedestrian movement will be prioritised by the design.

The development includes for public realm refurbishment and enhancement at Sean Healy Park comprising the development of a new vehicular parking area with entry and exit, footpaths and hard paved areas, widening of the Blueway and the development of associated landscaping and services/utilities to serve the proposed and future uses. The extension of the Suir Blueway along North Quays to provide cycleway and pedestrian linkages from Sean Healy Park to Ormond Castle and the town centre. The upgrading of Strand Walk with new paving and the development of a new access to Ormond Castle grounds and closing of the existing ramped access.

The nature and extent of the proposed development is as follows:

- New streetscape layout for Main Street with new alignment design for footpaths and trafficked areas incorporating new paving, kerbing, hard and soft landscaping and street furniture.
- Alteration of on street parking for Main Street and other Streets.
- New surface finishes to laneways linking Main Street to car parks and the Quays and laneways off Main Street.
- Demolition of a derelict building on Strand Lane to facilitate development of additional car parking spaces and an improved public realm.
- Development of new surfacing and landscaping to Strand Lane/Oven Lane car park.
- Development of a new vehicular carpark at Sean Healy Park adjoining the N24 accessed from the N24 and exiting onto Quay Rd.
- Upgrade and widening of existing and development of new pathways and hard and soft paved areas in Sean Healy Park. Development of services and utilities to facilitate future development at Sean Healy Park.
- Upgrade of surface finishes and alterations to the alignment of footpaths and trafficked areas along the North Quays from Sean Healy Park to Ormond Castle. New builds outs will be developed to calm traffic.
- Upgrade of surface finishes and alterations to the alignment of footpaths and trafficked areas along Greystone St and West Gate.
- Development of sections of glass infill to North Quay Walls to open views to the river at the south of Oven Lane.

- Upgrade of footpaths and trafficked area along Greystone Street and West Gate with new paving, kerbing, lighting etc
- Upgrade of footpath along Strand Walk with new paving and development of new access into Ormond Castle Grounds. This involves development of new steps and a ramp and removal of a section of the existing wall bounding the Ormond Castle grounds. The existing ramp connecting Castle Park to Strand Walk to be removed and this access closed.
- Development of associated drainage services and utilities
- Undergrounding of overhead electrical cables and upgrading of public lighting.
- Development of EV parking spaces and associated infrastructure at Sean Healy Park and Strand Lane.
- All associated site works.

The areas included in the Carrick-on-Suir Regeneration plan:

- Castle Lane
- Pill Road (Strand Walk)
- North Quay
- Main Street
- Barrack Lane
- Chapel St./New Lane
- Ball Alley Lane
- Oven Lane
- Strand Lane
- Bridge Street
- West Gate
- Greystone Street
- Sean Healy Park
- William Street
- Cook Lane
- Rose's Lane
- Hotel Lane
- Kiersey Place
- Entrance to Heritage Centre
- Entrance to Foran's Car Park
- Well Road

The Plan will primarily deliver the following two elements:

1. Design and Enhancement of the Suir Blueway at Carrick on Suir and Healy Park

The Suir Blueway Tipperary is a 53km walking, cycling and watersports trail stretching from Cahir to Carrick on Suir. Carrick on Suir forms the eastern focus of the Suir Blueway and has an important role in services provision and in the visitor experience of the area. It is proposed to prepare a design, enhancement and orientation scheme from Healy Park that will consider best practice in user needs i.e. kayakers, cyclists, walkers, this will extend along the quays. An arrival point will be created at Healy Park and an integrated approach to way-finding (paving, interpretation, lighting, technology, etc). linking the Blueway with the Town Centre and Ormond Castle Quarter.

2. Regeneration, design and enhancement of the central area and public realm

The Main Street is the central spine of the town and forms a direct link between Ormond Castle Quarter and Sean Kelly Square; this is the commercial, social and cultural hub of the town. The town centre will be uplifted to become a pleasant place to be, through the development of pedestrian friendly 'zones/character areas' and enhanced way-finding i.e. through paving, interpretation, lighting, etc. A high quality public realm and review of opportunity sites and synergies in terms of their regeneration will also be incorporated with solutions developed collaboratively.

The overall site layout is indicated on Figure 1.2.1 below.

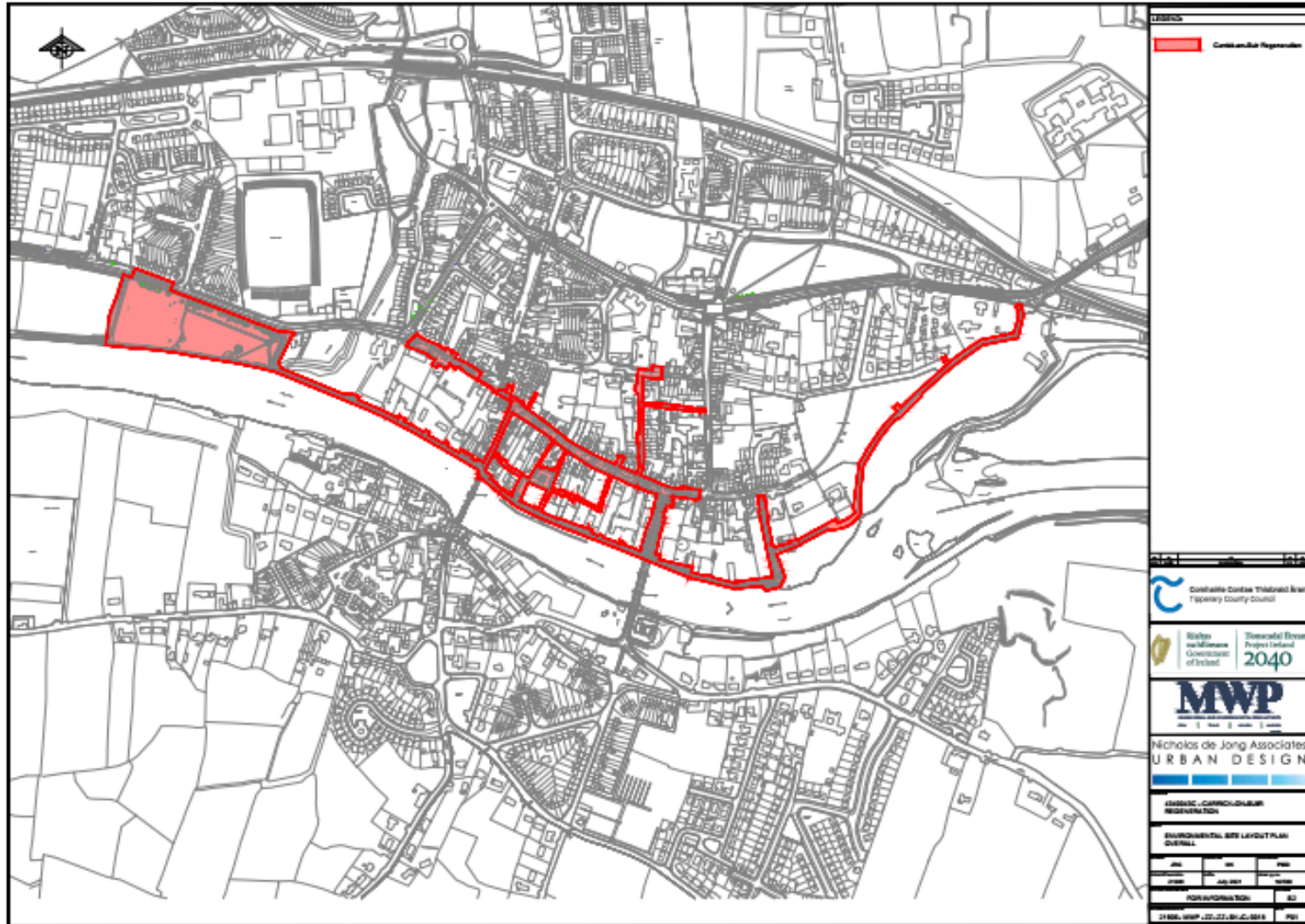


Figure 1.2.1: Proposed Site Layout (Site Boundary Outlined in Red)

1.3 Scheme Details Relating to Drainage & Flood Risk

1.3.1 Sean Healy Park

Sean Healy Park has a site area of circa 2.1 hectares. It is currently used as a public park with sports pitches.

The proposed site layout plan for Sean Healy Park is indicated on Figure 1.3.1 below. The proposed works include:

1. A new parking area which will consist of permeable surfacing such as grasscrete therefore no new drainage systems are proposed within the park.
2. Pathways connecting to the Blueway, the river's edge, the Quays, the Town centre and Ormond Castle Quarter. The pathway connecting the park to the quays will be via a ramp over the existing flood defence adjacent to the eastern boundary of the park and will not reduce the finished level of the flood defence.
3. Wildflower grassland surrounded by pathways
4. Amenity grassland

There are future plans to construct a viewing mound and riverside beach in Sean Healy Park however this does not form part of the current Part VIII application and is not considered in this Flood Risk Assessment. It is recommended that a flood risk assessment is carried out in the future to inform the design of any such features at this site.



Figure 1.3.1: Sean Healy Park - Proposed Site Layout

1.3.2 North Quays

The proposed works at the North Quays include:

1. The provision of enhanced footpaths with intermittent two-way buildouts and replacement of the existing asphalt road surfacing with a combination of granite sets and coloured asphalt.

1.3.3 Town Centre Quays & Laneways

The proposed works at the Town Centre Quays & Laneways include:

1. Replacing the existing surfacing with various types of granite sets to accommodate vehicular and pedestrian traffic.
2. At 4no. locations, it is proposed remove short sections of the existing quay wall and replace it with a glazed barrier.
3. Provision of street trees in root cells or raised planters will be provided at the locations indicated on the drawings.

1.3.4 Main Street & Sean Kelly Square

The proposed works at Main Street & Sean Kelly Square include:

1. Replacing the existing surfacing with various types of granite sets to accommodate vehicular and pedestrian traffic, incorporating intermittent ramps along the street to raise the road from street level to kerb level
2. Provision of rain gardens, raised planters, street trees in root cells or raised planters will be provided at the locations indicated on the drawings.

1.3.5 Ormand Castle Park & Walkway

The regeneration of Ormand Castle Park is subject to a separate Pat VIII planning application and is not included within the scope of this Flood Risk Assessment.

The scope does include for upgrading the walkway from Pill Road to the South of Ormonde Castle which will be laid to falls such that surface water will run into adjacent green spaces.

1.4 Objectives

The purpose of this report is to establish the flood risk associated with the proposed development and, if appropriate, to recommend mitigation measures to prevent an increase in flood risk within or outside the site.

The report has been prepared in the context of *The Planning System and Flood Risk Management – Guidelines for Planning Authorities, November 2009 (PSFRM)*, published by the Office of Public Works and the Department of Environment, Heritage and Local Government. Flood Risk Assessments are carried out at different scales by different organisations. The hierarchy of assessment types are Regional (RFRA), Strategic (SFRA) and Site-specific (FRA). This report is site-specific.

1.5 Methodology

The Flood Risk Management Guidelines document outlines three stages in the assessment of flood risk as follows:

- *Stage 1 Flood Risk Identification – to identify whether there may be any flooding or surface water management issues related to a plan area or proposed development site that may warrant further investigation;*
- *Stage 2 Initial Flood Risk Assessment – to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information and to determine what surveys and modelling approach is appropriate to match the spatial resolution required and complexity of the flood risk issues. The extent of the risk of flooding should be assessed which may involve preparing indicative flood zone maps. Where existing river or coastal models exist, these should be used broadly to assess the extent of the risk of flooding and potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures; and*
- *Stage 3 Detailed Risk Assessment – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures. This will typically involve use of an existing or construction of a hydraulic model or a river or coastal cell across a wide enough area to appreciate the catchment wide impacts and hydrological processes involved.*

1.6 Flood Risk in the Context of Minor Proposals

The Flood Risk Management Guidelines acknowledge that minor developments are unlikely to raise significant flooding issues unless they obstruct important flow paths or introduce a significant number of people to an area. The sequential approach cannot be used and a justification test does not apply. In such circumstances the Guidelines indicate that a Flood Risk Assessment should demonstrate that “the development would not have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities”.

2. Flood Risk Identification (Stage 1)

Possible sources of flood risk were identified by;

- Walkover Survey of the Site
- Local Knowledge
- Flood History
- Suir CFRAMS Study
- Topographical Survey Information

There is a history of fluvially dominated flooding at Carrick-on-Suir. A flood relief scheme has been constructed in the down which involved the construction of flood defence walls on top of the existing quay walls and the construction of an earth embankment through Sean Healy Park.

The site and surrounding areas were inspected by MWP on a number of occasions throughout the design development in order to identify and understand potential flooding mechanisms and flow paths.

The topographical survey of Sean Healy Park indicates that the existing ground levels vary from approximately +2.7mOD adjacent to the banks of the River Suir to +4.7mOD at the top of the flood defence embankment. The typical elevation within the park is in the range of 3.5 to 4mOD.

The Suir CFRAM Study indicates that the areas within the proposed development are at risk of both tidal and fluvial flooding.

The information collected during the Stage 1 FRA indicates that there is potential for flooding at the site therefore a more comprehensive assessment of the flood risk is required.

3. Initial Flood Risk Assessment (Stage 2)

The purpose of the Initial Flood Risk Assessment is primarily to ensure that the relevant flood risk sources are identified so that they can be addressed appropriately in any necessary Detailed Flood Risk Assessment.

3.1 Flooding Sources

The potential sources of flooding and their relevance to the flood risk at the site are outlined in the following sub-sections.

3.1.1 Fluvial Flooding

Fluvial flooding occurs when the capacity of a river channel is exceeded and water flows onto the adjacent land or flood plain. The nearest source of fluvial flooding to the site is the River Suir which is located to the south of the development area, adjacent to the southern boundary of Sean Healy Park.

A Stage 3 - Detailed Flood Risk Assessment will be carried out in relation to this potential source of flooding.

3.1.2 Estuarial or Tidal Flooding

Estuarial or tidal flooding is caused by higher than normal sea levels which occur primarily due to extreme high tides, storm surges, wave action or due to high river flows combining with high tides. The Suir CFRAMS coastal

flood extent map indicates that there is potential for tidal flooding which will be address further in the Stage 3 - Detailed Flood Risk Assessment.

3.1.3 Pluvial Flooding & Overland Flow

Pluvial flooding or overland flow occurs when rainfall intensity exceeds the infiltration capacity of the ground. The excess water flows overland to the nearest watercourse or piped drainage system. Intense rainfall events can result in ponding in low areas or upstream of physical obstructions. Overland flow is most likely to occur following periods of sustained and intense rainfall when the ground surface becomes saturated. Overland flow can also occur due to river flooding where the overbank flow from a point upstream runs across an area before returning to the river channel further downstream. This type of flooding is not uncommon and can occur where there is no direct risk from an adjacent or nearby river channel.

Whilst this flood risk cannot be ruled out within an existing urban area such as Carrick on Suir, it is considered that the nature of the proposed development is such that the dominant flood risk relates to fluvial and tidal events and pluvial or overland flooding would not have a significant bearing on the assessment, particularly since existing runoff characteristics and drainage paths will not be significantly altered. For these reasons, it is not considered necessary to address pluvial and overland flooding in the Stage 3 flood risk assessment.

3.1.4 Groundwater flooding

Groundwater flooding occurs when the water table rises to the level of the ground surface. This typically occurs in areas with karst bedrock. The GSI Groundwater Flooding data viewer was examined and it was found that there is no record of any such flooding and the predictive maps do not include flooding in this area. Groundwater flooding also occurs relatively slowly and poses a low hazard to people. For these reasons this source of flooding will not be considered further in this report.

3.2 Conclusions

It has been established that there is potential for flooding in the area therefore a Stage 3 FRA is required in order to provide a quantitative appraisal of potential flood risk to the site and to examine the potential impact of the development on flood risk elsewhere.

4. Detailed Flood Risk Assessment (Stage 3)

4.1 Introduction

The purpose of this Stage 3 FRA is to assess flood risk issues in sufficient detail to provide a quantitative appraisal of potential flood risk to the site, of the potential impact of the development on flood risk elsewhere and to establish what mitigation measures, if any, may be required.

4.2 Flood Risk

4.2.1 Predicted Flood Levels

The predicted flood levels at specific locations along the River Suir are provided on Table 4.2.1 below based on the Suir CFRAM Study flood extent maps.

It is apparent that flood risk is higher for fluvial dominated events at the upstream areas of the scheme however downstream of Old Bridge (TSUIR39934) tidal flooding becomes dominant.

Suir CFRAMS - Predicted Flood Levels (Current Scenario)					
CFRAMS Node Label	1%/0.5% AEP *		0.1% AEP		Node Label Relevance (Approximate location)
	Fluvial	Tidal	Fluvial	Tidal	
TSUIR40743	3.67	3.39	3.98	3.51	Upstream Healy Park
TSUIR40288	3.48	3.32	3.76	3.45	Downstream Healy Park/Upstream North Quays
TSUIR39934	3.06	3.20	3.24	3.34	Town Centre Quays
TSUIR39483	2.92	3.13	3.06	3.27	Downstream Town Centre Quays & Pill Road Walkway
TSUIR39162	2.98	3.14	3.13	3.28	Pill Road Walkway/Ordmand Park

* 0.5% for Tidal dominated flooding and 1% for Fluvial dominated flooding

Table 4.2.1: Predicted Flood Levels for Current Scenario

4.2.2 Flood Defences

According to the Suir CFRAM flood extent maps, the streets and quays within the regeneration area are protected by flood walls or embankment up to the 2% AEP (or 50 year return period) flood event. The quay wall defences include removable flood barriers at access points to the river. Based on the topographical survey provided, the top of the flood defence walls is summarised as follows:

- Along the north quays: 4.27m or greater
- Town Centre Quays: 3.97m or greater

The majority of Sean Healy Park is not protected by defences however there is a flood embankment near the northern and eastern boundaries which also provides a 2% AEP level of protection according to the Suir CFRAM

Study. Based on the topographical survey provided, the top of the flood defences at Sean Healy Park can be summarised as follows:

- Northern Embankment/Raised Ground: 4.5m
- Eastern Wall & Raised Ground: 4.3m or greater

The upgraded walkway from Pill Road is not protected by flood defences.

Based on the flood levels summarised in the previous sub-section, overtopping of defences is not predicted at Sean Healy Park or on the Quays, although freeboard is less than may be desirable at some locations. The CFRAM Study maps indicate that, for the 0.1% AEP fluvial event, there may be a flow path to Sean Healy Park and to the quays and town centre via the N24 upstream of Sean Healy Park however the finished road levels immediately to the west of the park being at least 4.3m suggests that this is unlikely.

4.2.3 Flood Zones

The PSFRM Guidelines document defines three flood zone types as follows:

Flood Zone A – where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding);

Flood Zone B - where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding); and

Flood Zone C - where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

The flood zones established for this flood risk assessment are based on the Suir CFRAM Study flood extent maps. Extracts from these maps are provided on Figures 4.2.2 to 4.2.5 below for the dominant fluvial/tidal event. The following is noted:

1. At Sean Healy Park the southern portion of the site is in flood zone A and the balance of the site is mainly in flood zone B, with the exception of some higher ground towards the north and east of the site which is in flood zone C.
2. The North Quays and Town Centre Quays are predominantly in Flood Zone A.
3. Main Street is in Flood Zone C.
4. Pill Road Walkway is in Flood Zone C for fluvial events. Although the walkway is not connected to the floodplain for tidal events, the maps indicated that flooding map occur along the walkway and could be in Flood Zone A or B.

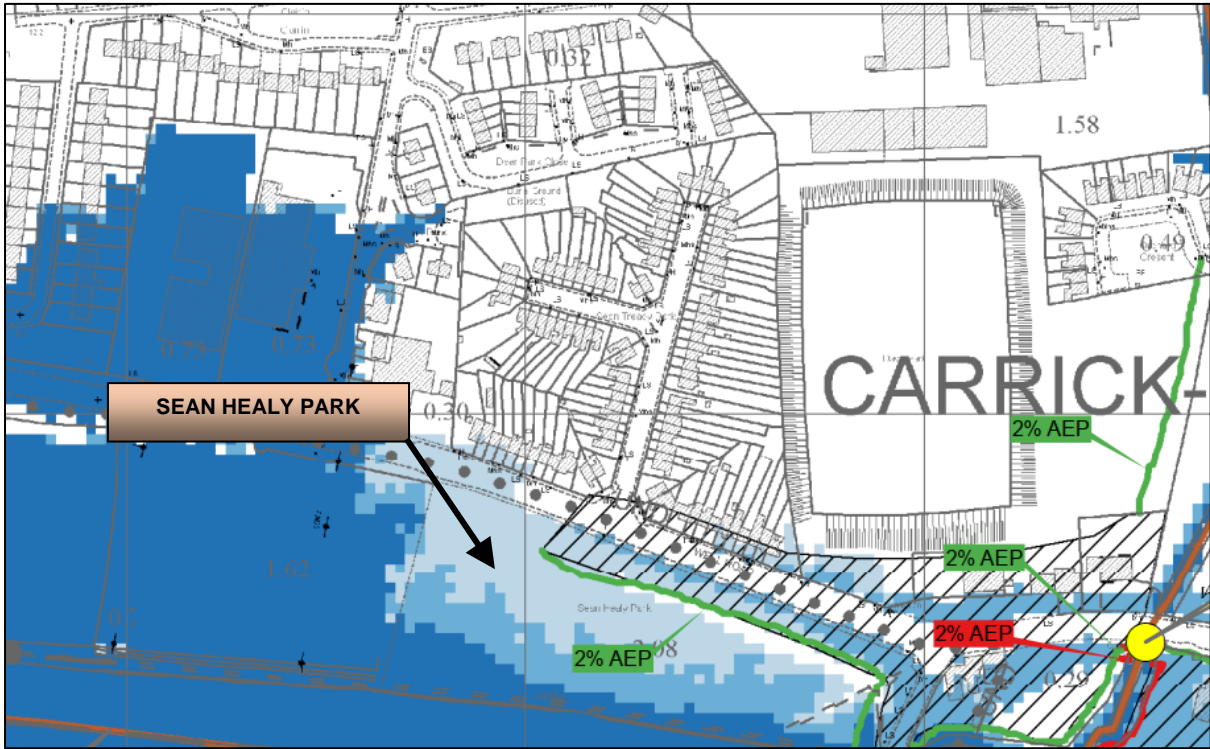


Figure 4.2.2 – Flood Zone Mapping at Sean Healy Park (Fluvial)

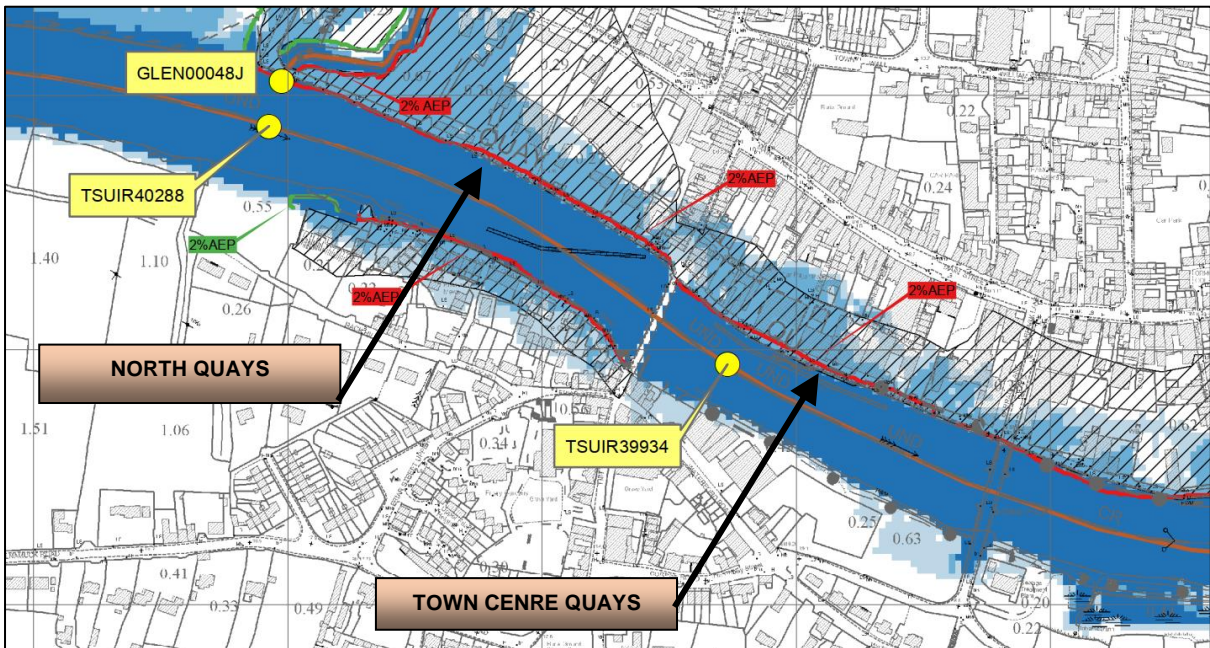


Figure 4.2.3 – Flood Zone Mapping at North Quays & Town Centre Quays (Fluvial)

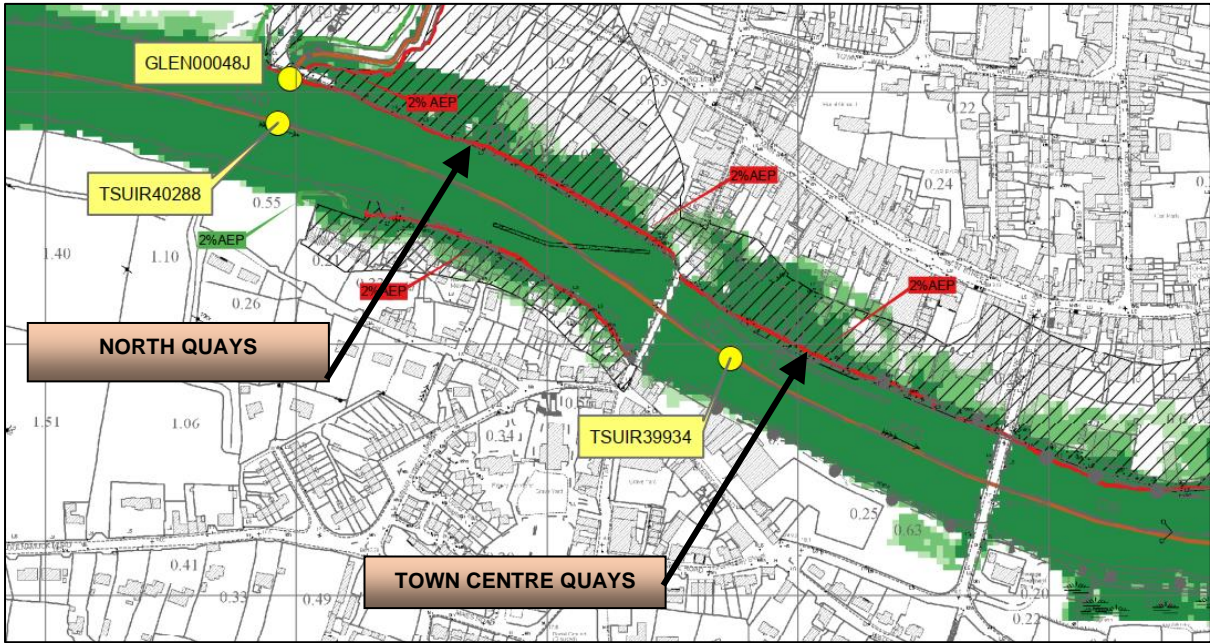


Figure 4.2.4 – Flood Zone Mapping at North Quays & Town Centre Quays (Tidal)

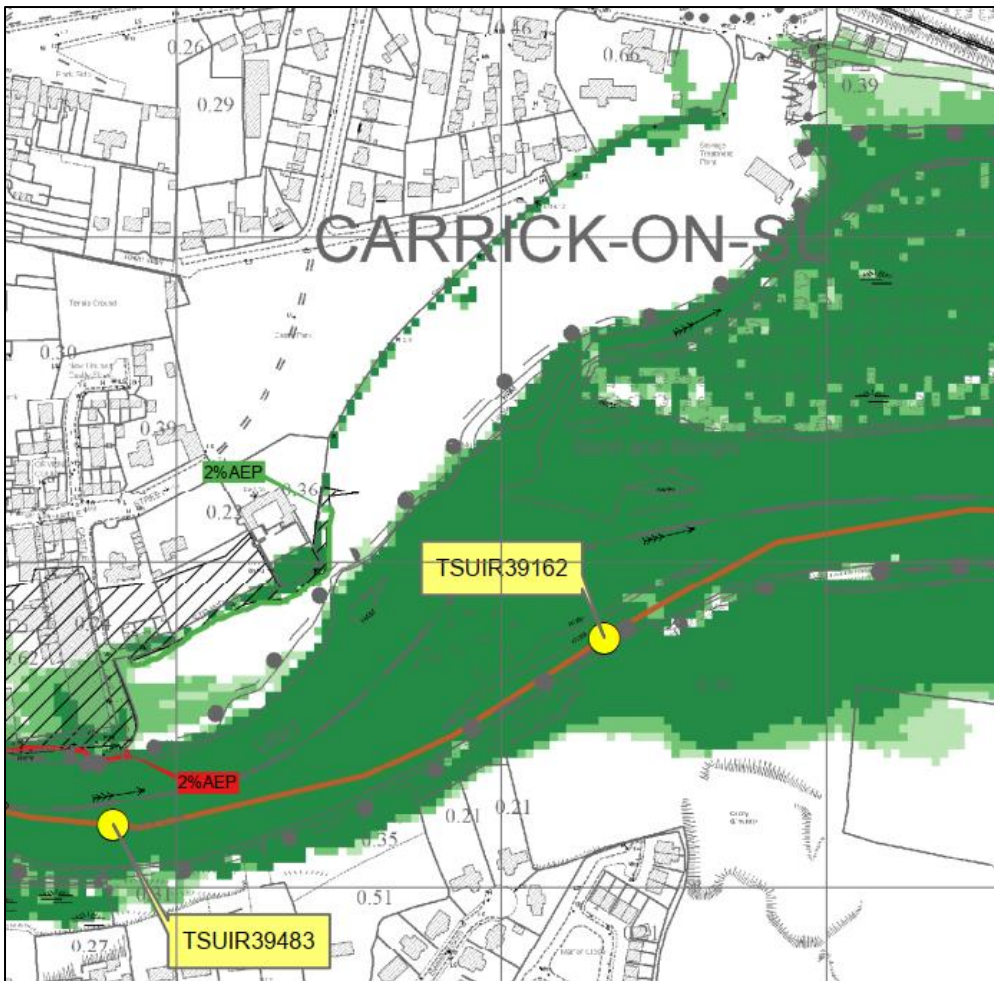


Figure 4.2.5 – Flood Zone Mapping at Pill Road Walkway (Tidal)

4.3 Vulnerability of the Proposed Development

The Flood Management Guidelines have outlined three Vulnerability Classifications for developments based on the proposed land use and type of development. These classifications and particular examples of development types which would be included in each classification are summarised as follows;

1. **Highly Vulnerable Development:** This would include emergency services, hospitals, schools, residential institutions, dwelling houses, essential infrastructure, water & sewage treatment etc.
2. **Less Vulnerable Development:** Retail, leisure, commercial, industrial buildings, local transport infrastructure.
3. **Water-compatible development:** Docks, marinas and wharves. Amenity and open space, outdoor sports and recreation and essential facilities such as changing rooms.

The Guidelines also include a matrix of vulnerability versus flood zone to differentiate between developments which are appropriate in various flood zones and those which require a Justification Test. This table is reproduced as Table 4.2 below.

Vulnerability Classification	Flood Zone A	Flood Zone B	Flood Zone C
Highly Vulnerable Development	Justification Test	Justification Test	Appropriate
Less Vulnerable Development	Justification Test	Appropriate	Appropriate
Water Compatible Development	Appropriate	Appropriate	Appropriate

Table 4.2: Vulnerability Matrix

Given the proposed scheme involves minor works for the regeneration of the existing urban town in Carrick on Suir, a Justification Test does not apply. Furthermore, the proposed works at Sean Healy Park and Pill Road walkway would be consistent with Water Compatible Development. Therefore, a Justification Test is not required for this development.

On this basis, the proposed scheme is considered to be appropriate in the context of the Flood Risk Management Guidelines, subject to complying with the other relevant requirements outlined in the Guidelines.

4.4 Mitigation Measures

4.4.1 Maintaining Existing Flow Paths & Floodplain Storage

The proposed alterations will not significantly change the existing ground levels across the scheme. The existing flood defence embankments and walls will be retained and will not be compromised by the proposed scheme. Therefore, the proposal will not impact any important flow paths and will not affect floodplain storage or conveyance. The detailed design of the scheme should ensure that all levels and details are set on this basis.

4.4.2 Surface Water Drainage & SuDs

The majority of the proposed works include cosmetic changes to the existing streetscape, replacing the existing surface finishes with upgraded finishes to footpaths and providing shared surfaces. The runoff characteristics of the proposed finishes will be consistent with the existing. Rain gardens and tree pits with reservoirs will be provided along Main St. A new car park will be provided to the North of Healy Park, this will have a permeable finish. Any new pathways within Healy Park will be laid to falls to allow surface water to run into the adjacent green spaces. Similarly the upgrade to the walkway surface along Pill Road to the South of Ormonde Castle will be laid to falls such that surface water will run into adjacent green spaces. Once the scheme design is completed on this basis, the proposed scheme will not create additional surface water runoff that could otherwise increase flood risk elsewhere.

4.4.3 Glazed Flood Barriers

Where it is proposed to remove sections of the existing quay wall flood defences and replace these with glazed barriers, the minimum height of the new barrier should match the height of the existing defences. The design of these barriers is outside of the scope of this report however all barriers should be designed and certified to safely withstand the pressures exerted from the adjacent river and to prevent ingress of water across any joints or interfaces. This will ensure the new barriers will provide a level of protection that is at least as good as the existing flood defences.

4.4.4 Life Saving Equipment

Appropriate life-saving equipment should be provided at suitable locations in Sean Healy Park and at all access points to the river along the quays and walkways. The final details should be determined at detailed design stage.

4.4.5 Flood Awareness & Emergency Planning

It is recommended that any existing flood awareness and emergency plans relating to the town are updated to account for the new scheme. If none exists it is recommended that a suitable emergency plan is developed to ensure that users are aware of the potential for flooding Tipperary County Council staff and other emergency services are equipped to respond quickly to flood events. The Emergency Plan should include the following;

- Roles & responsibilities of management and staff
- Flood warning sources (i.e. media, Tipperary County Council, Met Eireann)
- Flood sources and depths
- Estimated flood warning time(s)

- Procedures for checking river levels
- Flood warning stages and action plan
- Methods for disseminating flood warnings and alerts
- Procedures for flood barrier installation & for implementing other flood risk management measures
- Safe refuge areas
- Safe Evacuation Procedures
- Stand-down, recovery & clean-up operations
- List of contacts (i.e. OPW, Tipperary County Council, emergency services etc.)
- Safety, Health & Welfare considerations
- Staff training and testing the flood emergency plan

4.5 Assessment of Risks to Occupants

4.5.1 North Quay & Town Centre Quays

As noted in the previous section, the majority of areas included in the scheme are protected up to the 2% AEP event according to the Suir CFRAMS. A comparison of the predicted flood levels with the topographical data available indicates that overtopping of the defences within the town is unlikely to occur for the current 0.1% event.

On this basis the risk to occupants would be low except in the case of a flood defence failure or exceedance event. In the event of such an occurrence, there is an opportunity for users of the public roads and paths to retreat to higher ground which is located a short distance to the north of the quays. The proposed scheme does not change the access routes for emergency services and egress routes are not blocked. Therefore, existing emergency response and evacuation procedures for dealing with a flood event in the town would still apply. Furthermore, there is no change to the risk of posed to users of the North Quays and Town Centre Quays. For these reasons the risk to users of the roads and paths is considered to be acceptable in the context of this existing urban area.

4.5.2 Sean Healy Park & Pill Road Walkway

The proposed carpark is located on the protected side of the flood embankment which appears to be elevated above the 0.1% AEP flood level.

The flood level within Sean Healy Park would vary from approximately 3.76m to 3.98m therefore the flood depth would typically be less than 0.5m, although this would be significantly more adjacent to the river banks. This is not uncommon for public parks and recreation areas located adjacent to river banks.

Flow velocities are not available from the published CFRAMS maps to quantify flood hazard at this site, although velocities within the majority of the park are expected to be relatively low.

The nature of the park is such that it would not typically be used during heavy rainfall which could cause flooding therefore the likelihood of people being affected by flooding at the park is low.

Inundation of the park would occur relatively slowly providing ample warning for any users of the park to escape to higher ground before flood water reaches an area.

The pathways within the park all lead to higher ground and evacuation can occur quickly and with relative ease.

Based on the above comments it is considered that the risk posed to users of the park is acceptable.

4.5.3 Pill Road Walkway

The existing walkway is not protected by defences. Although it is located in Flood Zone C for fluvial flooding, the CFRAM Study maps indicate that flooding could occur for tidal dominated events. It is not possible to estimate the flood depth along the walkway using the information available however based on the CFRAM maps it appears to be relatively shallow and concentrated mainly along the line of the walkway. The flood hazard is expected to be low and there is ample space to retreat to higher ground adjacent to the walkway.

Based on the above comments it is considered that the risk posed to users of the walkway is acceptable.

4.6 Potential Impact of the Development on Flooding Elsewhere

As noted above, the proposal will not impact any important flow paths and will not affect floodplain storage or conveyance. Surface water runoff characteristics or volumes will not be significantly changed.

For these reasons, the development will not adversely impact flooding elsewhere.

5. Summary & Conclusions

A summary of the main findings of this FRA is as follows;

1. This report has been prepared in the context of The Planning System and Flood Risk Management – Guidelines for Planning Authorities, November 2009 (PSFRM), published by the Office of Public Works and the Department of Environment, Heritage and Local Government.
2. The Stage 1 FRA identified that there is a history of fluvially dominated flooding at Carrick-on-Suir. A flood relief scheme has been constructed in the town which involved the construction of flood defence walls on top of the existing quay walls and the construction of an earth embankment through Sean Healy Park.
3. The Stage 2 FRA indicated that there is a potential flood risk due to tidal and fluvial events for which a Stage 3 assessment was warranted.
4. The Suir CFRAM Study flood extent maps indicate that a large portion of the scheme is location within Flood Zone A and would therefore have a high probability of flooding. Notwithstanding this, the CFRAM Study indicates the existing flood defences provide a 2% AEP (50 year return period) level of protection.
5. The flood levels provided in the CFRAM Study for the current scenario were compared to the topographical survey data available for the existing flood defences. Based on this it appears unlikely that overtopping of the defences would occur in the 0.1% AEP event.
6. Mitigation measures have been provided in this report which will be sufficient to ensure that the flood risk is acceptable.
7. It was demonstrated that the proposed development will not have an adverse impact on flooding elsewhere and that the risk to occupants of the site would be acceptable.
8. Given the proposed scheme involves minor works for the regeneration of the existing urban town in Carrick on Suir, a Justification Test does not apply. Furthermore, the proposed works at Sean Healy Park

and Pill Road walkway would be consistent with Water Compatible Development. Therefore, a Justification Test is not required for this development and the scheme is considered to be appropriate in the context of the Flood Risk Management Guidelines.

6. References

The Planning System and Flood Risk Management – Guidelines for Planning Authorities, Office of Public Works and the Department of Environment, Heritage and Local Government, November 2009.

OPW *Planning and Development Flood Policy*, published on www.flooding.ie

OPW *Flood Hazard Mapping*, www.floodmaps.ie

Ireland and the IPCC 4th Assessment Report, Irish Committee on Climate Change, 2007

Suir CFRAM Study, Office of Public Works.



Appendix D

Traffic Assessment Report

MWP



Comhairle Contae Thiobraid Árann
Tipperary County Council

Nicholas de Jong Associates
URBAN DESIGN



Rialtas
na hÉireann
Government
of Ireland

Tionscadal Éireann
Project Ireland
2040

CARRICK-ON-SUIR REGENERATION PLAN

Traffic and Parking Impact Statement

Tipperary County Council

July 2021

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Appendices

Appendix 1 – JUNCTIONS OSCADY Analysis

Appendix 2 – JUNCTIONS PICADY Analysis

Appendix 3 – STAGE 1 ROAD SAFETY AUDIT

Project No.	Doc. No.	Rev.	Date	Prepared By	Checked By	Approved By	Status
21906	XX01-MWP-ZZ-ZZ-HS-Z-6012	P01	14/07/2021	K Concannon	S Quigley	P O'Donnell	PART 8
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1. Introduction

This Traffic and Parking Impact Assessment has been prepared on the instructions of Tipperary County Council as part of the Carrick-on-Suir Regeneration Project Part 8 Planning Application. The proposed Carrick-on-Suir Regeneration Project will include urban realm improvements to Main St, the creation of public amenities at Healy Park and the refurbishment of laneways and the quays.

2. Methodology

This Traffic and Parking Assessment has been prepared in the context of the following:

- Tipperary County Council's South Tipperary County Development Plan 2009 – 2015 (As Varied);
- Tipperary County Council's Carrick-on-Suir Town Development Plan 2013;
- Public Realm Improvement Design Scheme for Castle Street, Carrick-on-Suir (Tipperary County Council).
- The permitted Public Realm Improvements to Sean Kelly Square (Tipperary County Council).
- Feasibility Study for Improved Linkage of R676 Dungarvan Road and R680 Coolnamuck Road, Carrick-on-Suir; Tipperary County Council and Roadplan Consulting, March 2020;
- Carrick-on-Suir UDC Traffic Management Plan, Final Report Colin Buchanan and Partners, February 2002;
- The TII Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projects PE-PAG-02017 May 2019; and
- The Government's Design Manual for Urban Roads and Streets (Version 1.1) May 2019 (DMURS).

Traffic volumes on the proposed development site existing local road network have been established on the basis of on-site traffic counts carried out by MWP in April 2021, as Covid-19 restrictions were lifted, and TII automatic traffic counter data. TII automatic traffic counter data was used to factor the on-site traffic counts to pre-Covid 19 traffic volumes.

Parking data for Carrick-on-Suir was established using counts undertaken in 2013, as part of the Carrick-on-Suir Town Development Plan and in 2017, as part of the Public Realm Improvements to Sean Kelly Square.

3. Description of the Scheme

3.1 Description of the Scheme

The proposed development includes for public realm refurbishment and enhancement in Carrick on Suir's town centre comprising the upgrading of existing streets and lanes with new high quality paving, kerbing, public lighting, improved street furniture and utility diversions/works (including undergrounding of overhead ESB cables). Footpath space will be widened, traffic calming will be developed through build out, reduced road carriage widths and improved pedestrian crossings. Existing car parks will be improved and new car parking spaces provided. The traffic management at the junction of Main St and Dillon Bridge will change from a signal controlled junction to a priority controlled junction. Pedestrian movement will be prioritised by the design.

The development includes for public realm refurbishment and enhancement at Sean Healy Park comprising the development of a new vehicular parking area with entry and exit, footpaths and hard paved areas, widening of the Blueway and the development of associated landscaping and services/utilities to serve the proposed and future uses. The extension of the Suir Blueway along North Quays to provide cycleway and pedestrian linkages from Sean Healy Park to Ormond Castle and the town centre. The upgrading of Strand Walk with new paving and the development of a new access to Ormond Castle grounds and closing of the existing ramped access.

The nature and extent of the proposed development is as follows:

- New streetscape layout for Main Street with new alignment design for footpaths and trafficked areas incorporating new paving, kerbing, hard and soft landscaping and street furniture.
- Alteration of on street parking for Main Street and other Streets.
- New surface finishes to laneways linking Main Street to car parks and the Quays and laneways off Main Street.
- Demolition of a derelict building on Strand Lane to facilitate development of additional car parking spaces and an improved public realm.
- Development of new surfacing and landscaping to Strand Lane/Oven Lane car park.
- Development of a new vehicular carpark at Sean Healy Park adjoining the N24 accessed from the N24 and exiting onto Quay Rd.
- Upgrade and widening of existing and development of new pathways and hard and soft paved areas in Sean Healy Park. Development of services and utilities to facilitate future development at Sean Healy Park.
- Upgrade of surface finishes and alterations to the alignment of footpaths and trafficked areas along the North Quays from Sean Healy Park to Ormond Castle. New builds outs will be developed to calm traffic.
- Upgrade of surface finishes and alterations to the alignment of footpaths and trafficked areas along Greystone St and West Gate.
- Development of sections of glass infill to North Quay Walls to open views to the river at the south of Oven Lane.
- Upgrade of footpaths and trafficked area along Greystone Street and West Gate with new paving, kerbing, lighting etc
- Upgrade of footpath along Strand Walk with new paving and development of new access into Ormond Castle Grounds. This involves development of new steps and a ramp and removal of a section of the existing wall bounding the Ormond Castle grounds. The existing ramp connecting Castle Park to Strand Walk to be removed and this access closed.
- Development of associated drainage services and utilities
- Undergrounding of overhead electrical cables and upgrading of public lighting.
- Development of EV parking spaces and associated infrastructure at Sean Healy Park and Strand Lane.
- All associated site works.

The areas included in the Carrick-on-Suir Regeneration plan:

- Castle Lane
- Pill Road (Strand Walk)
- North Quay
- Main Street
- Barrack Lane
- Chapel St./New Lane
- Ball Alley Lane
- Oven Lane
- Strand Lane
- Bridge Street
- West Gate
- Greystone Street
- Sean Healy Park
- William Street
- Cook Lane
- Rose's Lane
- Hotel Lane
- Kiersey Place
- Entrance to Heritage Centre
- Entrance to Foran's Car Park
- Well Road

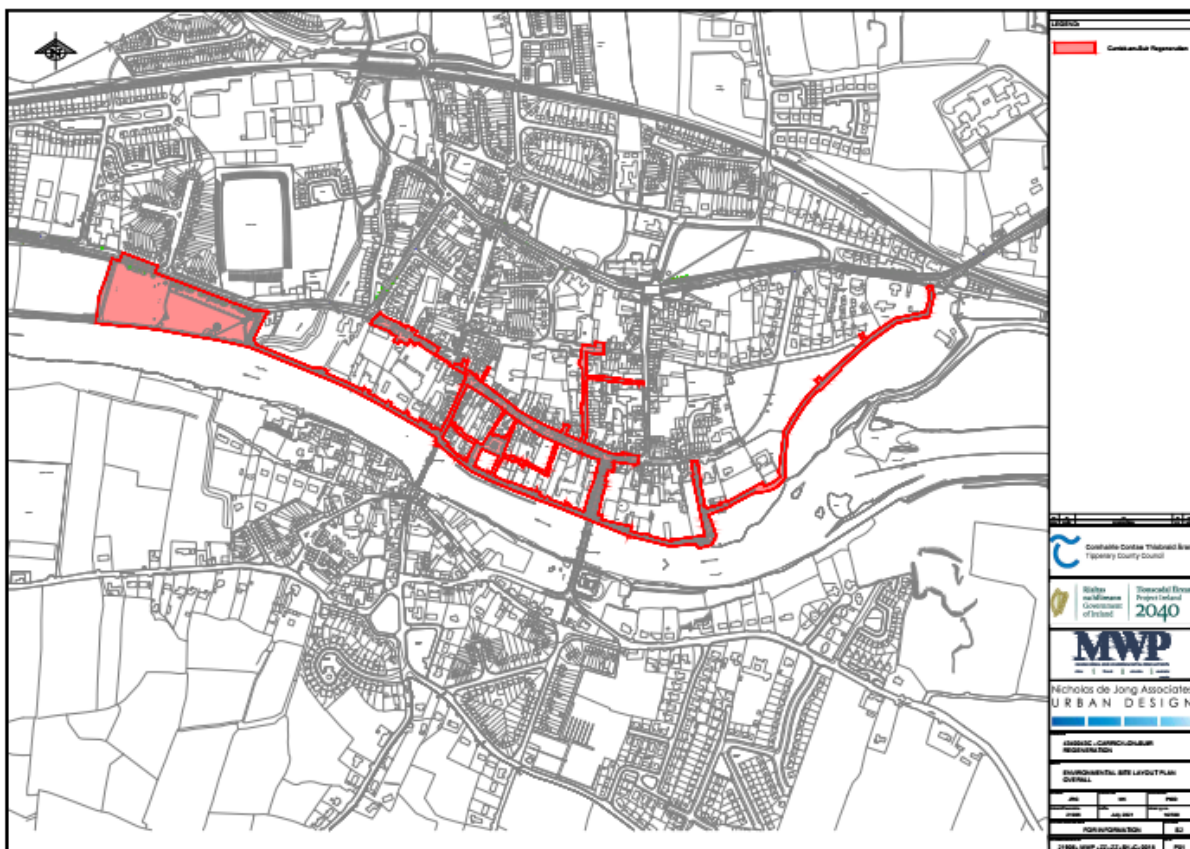


Figure 3.1: Site Extents in red

3.2 Scheme Objectives

The objective of the Carrick-on-Suir Regeneration scheme is to:

- Provide a focal point for activity/footfall including improving linkage from the Blueway to Ormond Castle to act as a driver for economic and social growth
- Reduce pedestrian/vehicle conflict and improving pedestrian safety;
- Reduce vehicle dominance on the main streets and improve junction capacity;
- Design the Main Street as a pleasant and safe place to be;
- Enhance the appearance of the town centre through careful design and selection of appropriate surfacing and street furniture;
- Safeguard the structure and appearance of heritage buildings by reducing the impact of vehicles
- Development of enhanced pedestrian and cyclist linkages throughout the town.
- Consider opportunities to enhance public realm at night
- Develop Healy Park as a water sports arrival point and community amenity

- Continue the Suir Blueway from Healy Park to the eastern side of Castle Park, this will support the long term collaborative vision to investigate ways to extend the Blueway eastwards towards County Waterford.

4. Existing Traffic Conditions

4.1 Transport Network

Carrick-on-Suir is located on the River Suir in Co. Tipperary. A one-way system is in operation in the town centre. An overview of the transport network in the town is provided in Figure 4.1. Main Street, which is the centre of retail and hospitality in the town, is one-way westbound. It has a typical width in excess of 6m, with on-street parking on both sides. Main Street continues west onto Seán Kelly Square, where vehicles can turn right onto Kickham Street or continue West to the N24.

Vehicles can enter Main Street from the New Street and Castle Lane approach. New Street is one-way southbound from its junction with Town Wall Street. North of Town Wall Street, it is two way, until its junction with the N24. New Street widens into a two-lane approach as it turns onto Castle Street, allowing vehicles to enter a straight ahead lane for Main Street or to turn left onto Dillon Bridge.

Dillon Bridge (Regional Road R680) crosses the River Suir, connecting Carrick-on-Suir with Dungarvan, Co. Waterford. This is an important regional connection. Vehicles wishing to use Dillon Bridge must enter the one-way system of Carrick-on-Suir town centre. Vehicles travelling southbound can access the bridge via New Street and Castle Street. Vehicles travelling northbound must exit the bridge onto Main Street and travel westbound. To cross the River Suir at Carrick-on-Suir is shorter in distance than crossing at Fiddown or at either of the crossings at Waterford City.

The junction of Main Street / Castle Lane / Dillon Bridge is an important connection in Carrick-on-Suir and is vital to the success of the public realm upgrade. It is a traffic signal-controlled junction. Phase 1 allows vehicles travelling from Castle Lane to go straight ahead to Main Street and turn left onto Dillon Bridge. Phase 2 allows vehicles to turn left from Dillon Bridge onto Main Street and to turn left from Castle Lane onto Dillon Bridge. Phase 3 is an all red phase which allows pedestrians to cross the arms of the junction.

The second bridge crossing at Carrick-on-Suir is Old Bridge, which connects the Quays in Carrick-on-Suir with Carrick-Beg in the south and onwards to the R676. The Old Bridge is one-way southbound. Access to the Quays in Carrick-on-Suir is provided via streets linking back to the N24 and Main Street.

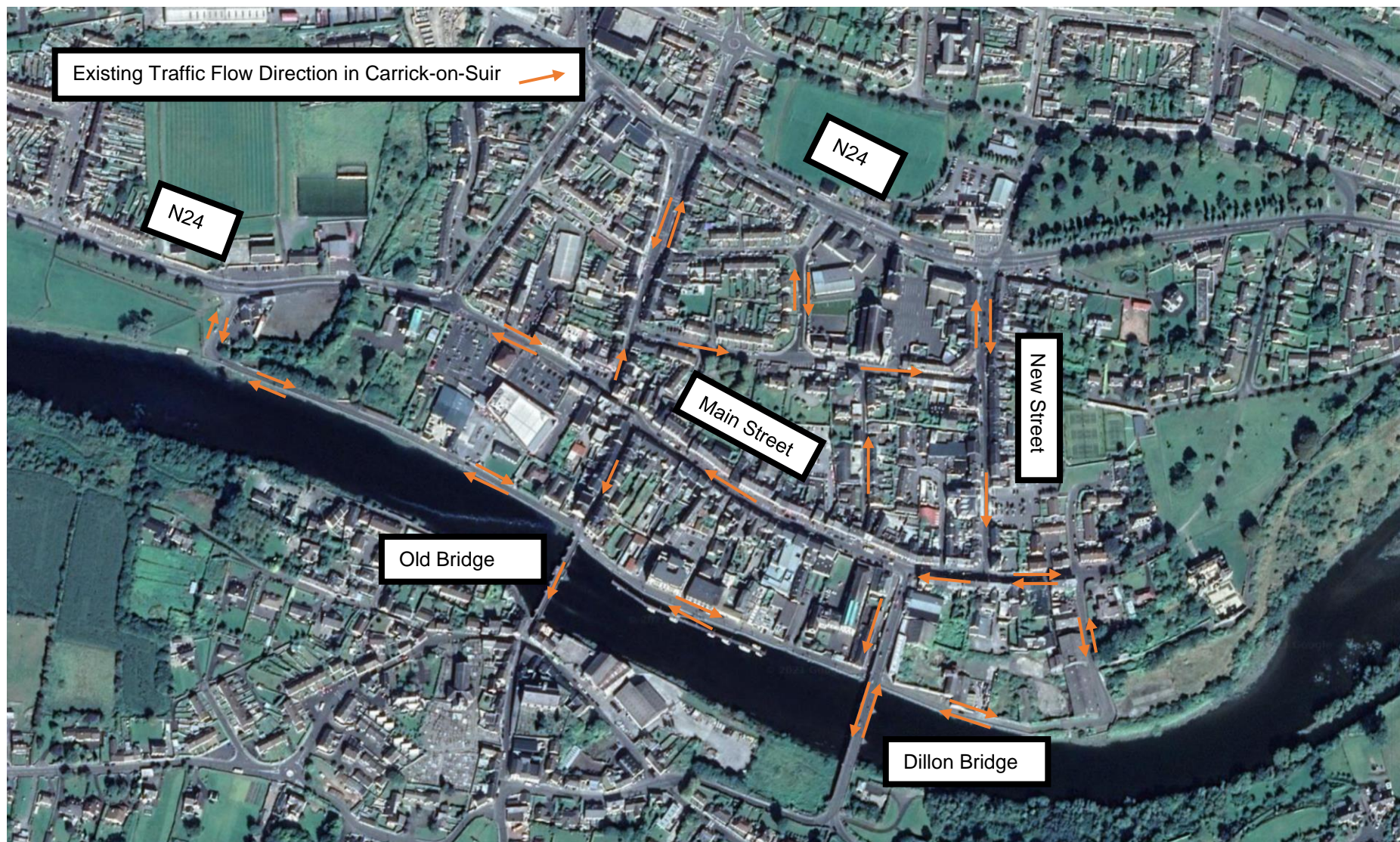


Figure 4.1: Overview of Transport Network in Carrick-on-Suir

4.2 Existing Traffic Volumes

This traffic study and assessment was undertaken during April – July 2021, during the Government’s Covid-19 restrictions and measures. This restricted on-site traffic surveys to record typical peak hour traffic volumes at the existing junction during 2021. Accordingly, on-site classified junction traffic volumes were recorded on Wednesday 12th April 2021. These were factored against TII Data counts for the N24 using the last full year AADT of 2019 and the TII N24 data from the same day as the recorded counts. These traffic counts were used in this assessment to establish typical existing and future baseline traffic volumes at the junction.

4.2.1 Main Street / New Street / Dillon Bridge

The junction provides access to Main Street, Carrick-on-Suir, which is one-way westbound. Traffic volumes are generated by retail and hospitality on Main Street and through traffic from/to the R608 south of Carrick-on-Suir. Morning peak hour, inter-peak hour (13:00 p.m. to 14:00 p.m.) and evening peak traffic counts were recorded. Morning and evening peak saw higher volumes of traffic coming from Dillon Bridge onto Main Street. The factored counts (accounting for Covid-19 restrictions) are show in Table 4.1.

Table 4.1: Recorded 2020 (factored) Peak Hour Junction Traffic Volumes

Main Street / Castle Lane / Dillon Bridge Junction				
Approach	Movement	AM Total vehicles (HGV)	PM Total vehicles (HGV)	Inter-peak Total vehicles (HGV)
Castle Lane	Left	306 (9)	249 (2)	317 (3)
	Straight Ahead	216 (2)	420 (0)	139 (5)
Dillon Bridge	Left	644 (7)	552 (10)	329 (5)

5. Future Traffic Conditions

5.1 Future Background Traffic Flows

Subject to planning permission and future construction, the proposed development will be fully complete and operational during 2023.

The TII Traffic and Transport Assessment Guidelines recommend that the opening year of a development proposal and plan years, given as 5 and 15 years after the opening year should be considered for assessing a development proposal. In this case, the opening year is 2023 and the plan years are 2028 and 2038.

TII in their Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections May 2019 envisage that car and light vehicle volumes on Tipperary national roads, will increase by an annual growth factor of 1.0119 during the period to 2030 and by a factor of 1.0306 for heavy vehicles, based on their central growth rates. The equivalent factors for the period 2030 to 2040 are 1.0037 and 1.0116, respectively.

The 2021 peak hour traffic volumes have been factored to 2023, 2028 and 2038 levels on the basis of the TII central growth rates. The predicted 2023, 2028 and 2038 peak hour traffic volumes are provided in Table 5.1.

Origin-Destination surveys were carried out on Wednesday 12th April 2021, for vehicles travelling from Castle Lane onto Main Street. 80% of all vehicles making the movement from Castle Lane onto Main Street had a destination of on-street parking on Main Street. With the reduction of on-street parking on Main Street proposed (67 spaces to 25 spaces), a reduction in the corresponding traffic volumes is anticipated. Using a conservative analysis, this has been factored into the future junction traffic volumes.

Table 5.1: Predicted 2023 Peak Hour Junction Traffic Volumes

Main Street / Castle Lane / Dillon Bridge Junction					
Approach		Movement	AM Total vehicles (HGV)	PM Total vehicles (HGV)	Inter-peak Total vehicles (HGV)
Castle Lane	2023	Left	313 (10)	255 (2)	325 (3)
		Straight Ahead	221 (2)	430 (0)	142 (5)
	2028	Left	332 (11)	270 (2)	344 (4)
		Straight Ahead	235 (3)	456 (1)	151 (6)
	2038	Left	345 (12)	281 (3)	357 (4)
		Straight Ahead	243 (3)	473 (1)	157 (7)
Dillon Bridge	2023	Left	659 (7)	565 (11)	337 (5)
	2028	Left	700 (10)	600 (12)	357 (6)
	2038	Left	726 (10)	622 (14)	371 (7)

5.2 Future Proposed Junction Facilities

It is proposed to provide a priority junction at Main Street / Castle Lane / Dillon Bridge, which is currently a traffic signal-controlled junction. This junction is the entrance into the public realm of Main Street and the intention is to provide a traffic calmed environment, with priority for pedestrians.

The proposed priority junction will operate with Castle Lane as the main arm, with priority. Traffic will travel straight ahead to Main Street or turn left onto Dillon Bridge. On Castle Lane, the existing two-lane approach will be reduced to one. Vehicles approaching Carrick-on-Suir on Dillon Bridge will be required to Stop at the junction and wait for a gap in the traffic to proceed onto Main Street. Main Street is one-way westbound. A pedestrian crossing will be located on each arm of the junction. Figure 5.1 shows the proposed priority junction layout.



Figure 5.1: Proposed priority junction layout at Main Street / Castle Street / Dillon Bridge

Carrick-on-Suir is the location of two bridge crossings of the River Suir. The Old Bridge, located on the west of the town is one-way only from north to south. Dillon Bridge, located on the east of the town takes two-way traffic. Traffic wishing to use Dillon Bridge must enter the one-way system of Carrick-on-Suir town centre. Vehicles travelling southbound can access the bridge via New Street and Castle Street. Vehicles travelling northbound must exit the bridge onto Main Street and travel westbound. To cross the River Suir at Carrick-on-Suir is shorter in distance than crossing at Fiddown or at either of the crossings at Waterford City.

It is proposed within the Waterford County Development Plan 2011 – 2017 (As Varied) and Carrick-on-Suir Town Development Plan 2013 that a third crossing is planned. This is proposed to be located on the west side of the town, removing the need for through traffic to travel through Carrick-on-Suir town centre. There is no available data for the traffic volumes that are predicted to reroute onto a third crossing. As part of this assessment, it is assumed in the predicted traffic volumes that there is no third crossing.

6. Junction Capacity Analysis

6.1 Existing Traffic Signals Junction

The existing Main Street / Castle Lane / Dillon Bridge traffic signal junction has been analysed using the computer software programme, TRL JUNCTIONS OSCADY for signal controlled junctions, for the predicted 2023 opening year and 2028 and 2038 plan years. The peak hour traffic volumes at the junction are summarised in Table 6.1 and detailed in Appendix 1. The summary refers to the AM morning peak, which has the highest predicted traffic volumes.

Table 6.1: Summary of Existing Traffic Signal Junction Capacity Analysis

Main Street / Castle Lane / Dillon Bridge Junction				
Approach	Year	Highest Ratio of Flow to Capacity (RFC)	Highest Mean Maximum Queue Length (vehicles)	Highest Delay per Vehicle (seconds)
Castle Lane	2023	0.36	5.7	23.01
	2028	0.36	5.8	23.06
	2038	0.36	5.8	23.07
Dillon Bridge	2023	0.96	15.8	58.06
	2028	0.97	16.6	61.98
	2038	0.97	16.7	62.31

A Ratio of Flow to Capacity (RFC) of 0.900 is considered to represent the typical practical capacity of a junction. The above analysis indicates, that without any changes to the existing junction, the junction will experience queuing and delays from Dillon Bridge onto Main Street in 2023, 2028 and 2038. Site observations noted that approximately 15 vehicles were likely to pass the green traffic signal on Dillon Bridge in one stage at the junction. An all-red pedestrian stage is included in the model, representing the traffic signals on site, which contributes to vehicle queuing in all phases, including from Castle Lane to Main Street.

6.2 Proposed Priority Junction

The proposed Main Street / Castle Lane / Dillon Bridge priority junction has been analysed using the computer software programme, TRL JUNCTIONS PICADY for priority controlled junctions, for the predicted 2023 opening year and 2028 and 2038 plan years. The peak hour traffic volumes at the junction are summarised in Table 6.2 and detailed in Appendix 2. The summary refers to the AM morning peak, which has the highest predicted traffic volumes.

Table 6.2: Summary of Proposed Priority Junction Capacity Analysis

Main Street / Castle Lane / Dillon Bridge Junction				
Approach	Year	Highest Ratio of Flow to Capacity (RFC)	Highest Mean Maximum Queue Length (vehicles)	Highest Delay per Vehicle (seconds)
Castle Lane	2023	0.19	0.2	2.43
	2028	0.19	0.2	2.44
	2038	0.19	0.2	2.44
Dillon Bridge	2023	0.98	11.1	68.20
	2028	0.99	12.1	74.79
	2038	0.99	75.33	12.2

A Ratio of Flow to Capacity (RFC) of 0.900 is considered to represent the typical practical capacity of the junction. The above analysis indicates that the predicted capacity of the priority junction will be marginally lower than the traffic signal junction layout on the Dillon Bridge approach in the opening year of 2023 and plan years 2028 and

2038. However, the highest RFC and highest maximum queue length for the Castle Lane approach will be significantly improved. This accounts for traffic travelling from Castle Lane to Main Street and turning left onto Dillon Bridge, unopposed at the proposed priority junction.

The proposed priority junction performs better than the existing traffic signal layout during the inter-peak period, which is more closely representative of the majority of the day outside of the peak times in Carrick-on-Suir, and includes retail and hospitality opening hours. This is summarised in Table 6.3.

Table 6.3: Summary of Proposed Priority Junction Capacity Analysis (Inter-Peak)

Main Street / Castle Lane / Dillon Bridge Junction				
Approach	Year	Highest Ratio of Flow to Capacity (RFC)	Highest Mean Maximum Queue Length (vehicles)	Highest Delay per Vehicle (seconds)
Dillon Bridge (with Traffic Signals)	2023	0.64	1.7	15.08
	2028	0.65	1.7	15.37
	2038	0.65	1.7	15.40
Dillon Bridge (with Priority Junction)	2023	0.60	6.5	25.63
	2028	0.60	6.6	25.83
	2038	0.61	6.6	25.84

7. Conclusions of Traffic Impact Assessment

The junction capacity analysis of the existing traffic signal junction and proposed priority signal junction indicate that the junction will continue to operate within capacity in the opening year 2023 and plan years 2028 and 2038.

The proposed priority junction will operate with an improved Ratio to Flow Capacity (RFC) in the opening year 2023 AM peak on the Castle Lane approach of 0.19, as opposed to 0.36 for the traffic signal junction. The highest mean maximum queue length will be 0.2 vehicles, compared to 5.7 for the traffic signal junction. The highest delay per vehicle second will be 2.43 seconds, compared to 23.01 seconds for the traffic signal junction.

The proposed priority junction outcomes on the approach from Dillon Bridge to Main Street are essentially the same as the existing. It will operate with a Ratio to Flow Capacity (RFC) in the opening year 2023 AM peak on the approach of 0.98, compared to 0.96 for the traffic signal junction. The highest mean maximum queue length will be 11.1 vehicles, compared to 15.8 for the traffic signal junction. The highest delay per vehicle second will be 58.06 seconds compared to 68.20 seconds for the traffic signal junction. These differentials would be relatively imperceptible, and highest peak hour queue lengths and delays would be typical for urban town centre junctions.

If the third crossing for Carrick-on-Suir proceeds to be planned and constructed, it will significantly reduce traffic travelling onto Main Street from Dillon Bridge, reducing forecast queuing and delays.

The proposed priority junction will operate with an improved Ratio to Flow Capacity (RFC) in the opening year 2023 inter-peak for all lane approaches. This will bring significant improvements to Main Street with regards to the public realm upgrade, reducing queuing traffic on the approach to town. Pedestrians will be able to cross in between gaps and when vehicles stop for them, reducing pedestrian wait times, compared to the traffic signal junction layout.

A proposed reduction in on-street parking and an improved public realm for pedestrians will also encourage more trips to Main Street by walking, further reducing the traffic volumes over time in the town centre.

8. Existing Parking Conditions

8.1 Parking Network

8.1.1 Parking provision

Parking is available to the public in Carrick-on-Suir by way of:

- On-street parking;
- Off-street parking in public car parks; and
- Off-street parking in private car parks.

There are approximately 696¹ available parking spaces within Carrick-on-Suir. Table 8.1 provides an overview.

Table 8.1: Available Car Parking Spaces

Type of Parking	Number of Available Car Parking Spaces
Car Park (Public)	320
Car Park (Private)	133
On-Street Parking	243
Total	696

Public car parks are available at the locations below:

1. New Street
2. St Nicholas
3. Strand Lane / Oven Lane
4. Fairgreen

¹ Carrick-on-Suir Town Development Plan, 2003

5. Garda Station
6. Parkside
7. Town Wall

On-street parking is available on:

1. Main Street
2. New Street
3. Castle Street
4. Cook Lane
5. Barrack Lane
6. Kickham Street
7. Chapel Street
8. Greenside South
9. Greenside North
10. De Valera Place
11. The Park
12. Parkside

Private car parks are available at the following locations:

1. Main Street
2. Supervalu
3. Bank of Ireland
4. The Pound

Figure 8.1 provides an overview of parking within Carrick-on-Suir.

8.1.2 Parking fees

Parking Bye-Laws for on-street and public car parks have been adopted by Tipperary County Council for Carrick-on-Suir. Paid parking is in place in Carrick-on-Suir. The fees for parking vary depending on the type of parking.

On-Street parking has a charge of 20 cents per 17 minutes, or 70 cents per hour. The period of parking varies depending on the street parked. Main Street, Seán Kelly Square and Barrack Lane have a one-hour parking limit, while the remaining streets have a two-hour period. A local arrangement is in place where 20 minutes free parking is available for on-street parking only. A ticket must be purchased after this.

Public car parks have a charge of 60 cents per hour, or part thereof. There is a maximum daily charge of €3.00. There is no time limit on the stay of the vehicle. A local arrangement is in place where Fairgreen is free.

Approximately 100 residents' permits are issued per year for anyone living in the town centre where paid parking applies. If a resident is living on a street where there is only one-hour parking allowed, then their permit is issued for the nearest public car park.



Monthly, quarterly, six monthly, nine monthly and yearly parking permits are available to non-residents for a reduced rate on the parking meter fees.

Main Street private car park operates on a charge of €2.00 per day.



Figure 8.1: Overview of Parking in Carrick-on-Suir



8.2 Existing Parking Volumes

Parking surveys were carried out in 2013 as part of the Carrick-on-Suir Town Development Plan and in 2017, as part of the Seán Kelly Square Part 8 Planning Application. These were reviewed in preparation for this Traffic and Parking Impact Assessment. While there are differences between the two survey sets, broadly the overall parking use in Carrick-on-Suir remained the same. Both sets of parking surveys were carried out in July, with the 2017 study providing data from a weekday (Wednesday) and a weekend day (Saturday).

Parking surveys were not undertaken in 2021 as part of this Traffic and Parking Impact Assessment due to the restrictions in place on retail, hospitality, work, and schools during the Covid-19 health emergency.

The average space capacity of car parking spaces in the town was 392, out of a total of 696 (56%). Of these available 392 car parking spaces, 291 (42% of all parking spaces) are within a five-minute walk of Main Street.

The 2017 parking surveys recorded if a vehicle was present in a parking space during a 30-minute period. A stress test was applied where the level of occupancy over the area every half an hour was measured. On the weekday, the overall occupancy level of all recorded car parking spaces in Carrick-on-Suir did not exceed 21%. On the weekend day the overall occupancy level did not exceed 25%.

8.2.1 Main Street and Strand Lane / Oven Lane Public Car Park

Main Street currently has 67 on-street car parking spaces. This includes five disabled spaces. In addition, there are two loading bays.

Strand Lane / Oven Lane public car park has 23 off-street car parking spaces. Two of these are for electric vehicle parking. There is an additional four car parking spaces that are reserved for private residents. Observations during site visits showed that up to 8 of the 23 car parking spaces were regularly used by cars displaying a residents permit from Tipperary County Council.

The stress test results for Main Street and Strand Lane / Oven Lane car park are shown in Table 8.2.

Table 8.2: Main Street and Strand Lane Parking Space Occupancy Test

Time	Wednesday Stress Test	Saturday Stress Test
07:00	14%	19%
07:30	13%	17%
08:00	15%	18%
08:30	21%	22%
09:00	23%	20%
09:30	32%	31%
10:00	37%	33%
10:30	38%	24%
11:00	30%	45%
11:30	37%	38%
12:00	39%	46%
12:30	36%	49%

Time	Wednesday Stress Test	Saturday Stress Test
13:00	38%	48%
13:30	30%	42%
14:00	31%	49%
14:30	38%	51%
15:00	35%	52%
15:30	40%	53%
16:00	38%	46%
16:30	34%	43%
17:00	36%	47%
17:30	33%	54%
18:00	34%	53%
18:30	34%	48%
19:00	18%	40%

As shown in the table above, parking on Main Street and in the nearby Strand Lane / Oven Lane car park has significant capacity. During peak times on a busy retail street (11:00 a.m. to 15:00p.m.), up to 50% of the available car parking spaces are available for use. Figure 8.2 visualises the average spare capacity for Main Street on-street parking.

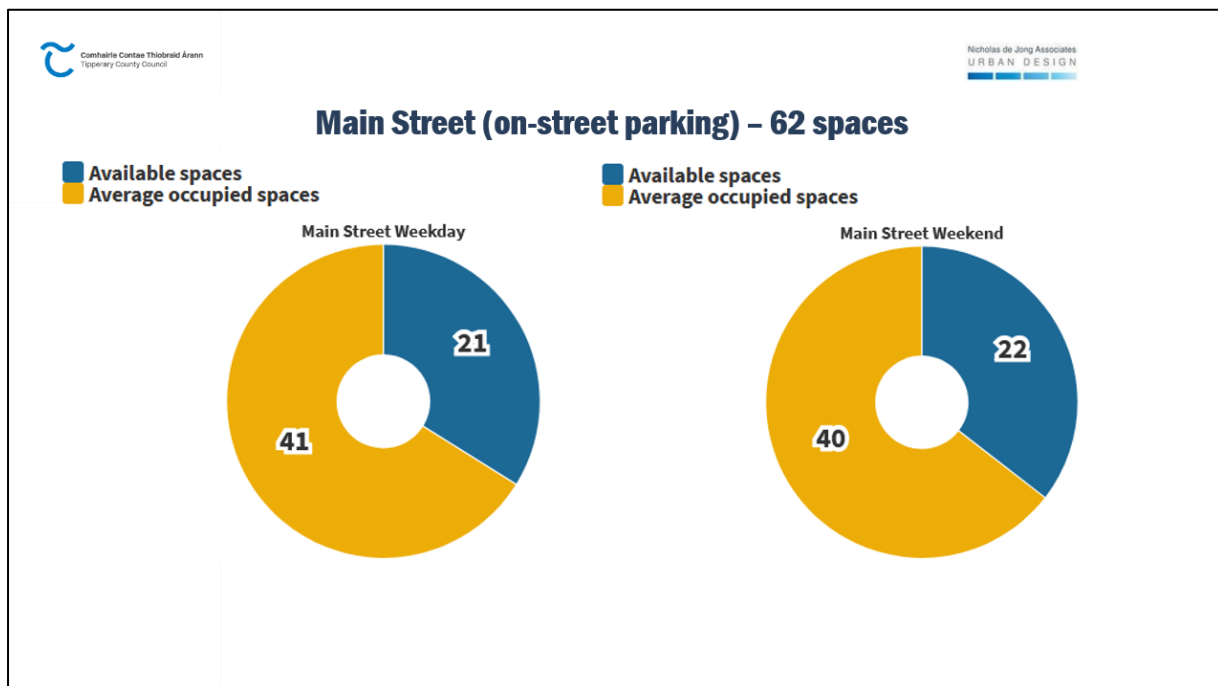


Figure 8.2: Average spare capacity of Main Street

Parking is free for the first twenty minutes on Main Street. The parking structure and the nature of retail parking mean that parking spaces are turned over quickly. Table 8.3 below shows the percentage of users and the time their vehicles were parked.

Table 8.3: Time spent parked on Main Street

Time	No. of Vehicles Parked (% of total daily parked)	
	Wednesday	Saturday
30 minutes or less	569 (86%)	101 (37%)
30 minutes to 1 hour	54 (8%)	66 (24%)
1 hour to 1.5 hours	18 (3%)	48 (18%)
2 hours or greater	18 (3%)	56 (21%)
Total vehicles on Main Street	662	271

8.2.2 Main Street Private Car Park

A private car park of 80 spaces can be accessed from Main Street, on its eastern end. It is barrier controlled and there is a €2.00 daily fee. The 2013 car parking survey records an average spare capacity of 33 spaces within this car park.

8.2.3 New Street Public Car Park

New Street public car park is accessed from New Street, opposite the Tipperary County Council offices. It has a capacity of 85 spaces, plus parking for buses. Typically, this car park is busy from mid-morning to early afternoon, similar to Main Street. It is also busy on weekend days. The stress test on the New Street public car park was similar to Main Street, with low numbers of between 10-30% in off peak times and 40-50% in peak times. Figure 8.3 shows the average spare capacity of the car park.

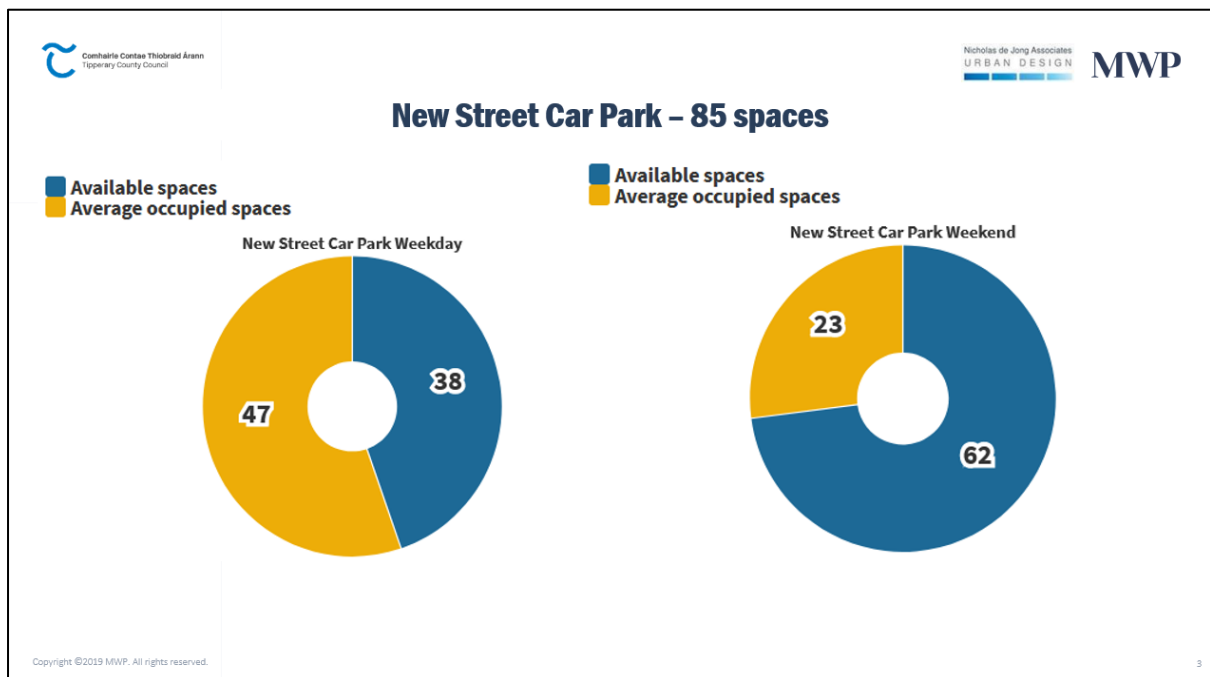


Figure 8.3: Average spare capacity of New Street Car Park

8.2.4 St. Nicholas' Public Car Park

St. Nicholas' Public Car Park has a capacity of 83 spaces. It is located next to St. Nicholas' Church and operates a one-way system. Entry is from Town Wall street and vehicles exit onto the N24. The car park is used a drop off and collection time for the nearby Presentation Convent National School and also for classes, workshops and functions in the church and its facilities. The stress test during the weekday showed the car park had a occupancy level of between 5-15%, with the exception of one hour where it rose to 39%. At the weekend, it followed a similar pattern to Main Street and New Street car park, with the highest occupancy levels between 11.00 a.m. and 15.00 p.m.. The highest occupancy level was 50% during a 30-minute period. Figure 8.4 shows the average spare capacity of St. Nicholas' public car park.

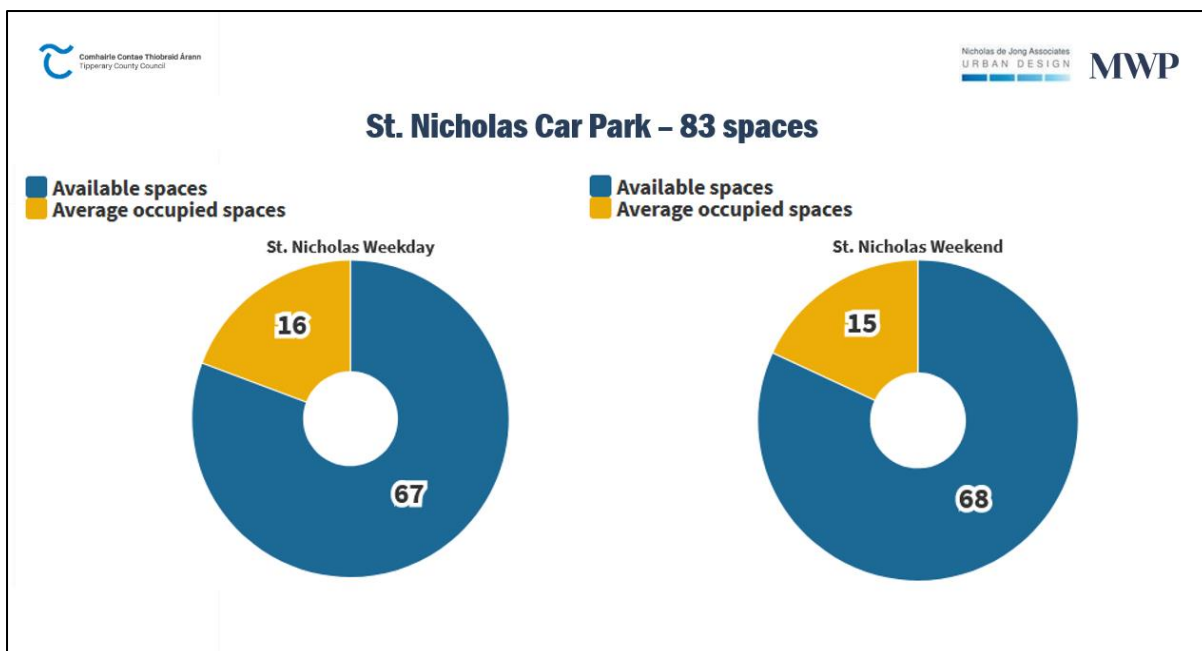


Figure 8.4: Average spare capacity in St. Nicholas' Public Car Park

8.2.5 Fairgreen Public Car Park

Fairgreen public car park is located on the north side of the N24 in Carrick-on-Suir. By local arrangement, it is free parking for all users. It has a capacity of 57 vehicles. It is typically full during school term as it is used for parking by nearby schools or by commuters who travel onwards by train or work in Carrick-on-Suir. It is an approximate 10 minute walk to Main Street from Fairgreen car park.

8.2.6 On-street parking

There is an estimated 243 on-street car parking spaces in within Carrick-on-Suir. The vast majority of these are within a five-minute walk of Main Street (refer to Figure 8.1). Of these, the average spare capacity was 107 spaces, or 44%.

9. Parking Impact of the Proposed Development

9.1 Proposed Changes to Car Parking

The objectives of the parking strategy are to provide a high-quality environment for those living in and visiting the town. Parking should be well connected by walking to the town or nearby amenities by way of high-quality public realm and direct paths. Parking locations will also take into account the ease at which they can be accessed from the road network. The parking strategy has been developed with the understanding that on-street and off-street parking are related and cater for different uses.

The parking strategy is based on an order of priority:

1. Residents and disabled vehicle users
2. Short or medium stay visitors (shoppers, tourists and business visitors)
3. Long-stay visitors (commuters to work)

Careful consideration has been given to the removal on parking, with an emphasis based on the order of priority established. Removal of parking has been considered for three key reasons:

- Parking spaces take up space that could be used for pedestrian and/or other public realm or environmental improvements;
- Vehicles manoeuvring in and out of spaces in streets with high pedestrian activity cause a particular hazard;
- Drivers will drive around the town centre streets looking for a free space, which contributes to unnecessary high volumes of traffic in the town centre, in particular on Main Street.

This point was notable during on-site journey surveys in Carrick-on-Suir on Wednesday 12th April 2021, where 16 out of 20 journeys (80%) from New Street to Main Street were by vehicles seeking parking on Main Street.

As part of the proposed development, changes are proposed to car parking provision on Main Street, Oven Lane and in Healy Park. Table 9.1 summarises the proposed changes.

Table 9.1: Proposed Changes to Car Parking

Location	Existing no. of spaces	Proposed no. of spaces	Net change no. of spaces
Main Street	67	25	-42
Oven Lane	23	33	+10
Healy Park	3	39	+36
Total	93	97	+4

9.1.1 Main Street

On-street parking provision on Main Street is proposed to be reduced as part of the regeneration scheme. A reduction in on-street parking allows for the design to accommodate:

- Pedestrians in a safe and comfortable wide footpath;

- A narrow carriageway which will encourage lower vehicle speeds, providing a more comfortable environment for pedestrians and cyclists;
- Space for outdoor seating and street furniture that allows for people to stay and enjoy Main Street;
- Trees and planting for an enhanced urban environment.

A reduction in available car parking will reduce the number of vehicles travelling on Main Street to find a parking space.

This reduction in on-street car parking is considered acceptable due to the large number of available car parking spaces within a five minute walk of Main Street (refer to Section 7 Existing Car Parking Conditions). Disabled parking and loading bays will be retained to ensure that access is maintained to Main Street.

9.1.2 St. Nicholas' Car Park

St. Nicholas' Car Park has been identified as an area of under-utilised car parking within Carrick-on-Suir town centre, with a capacity of 83 vehicles. It is within a five-minute walking distance (350m) of Main Street, via Chapel Street. It does not require vehicles to enter the New Street / Main Street one-way system to gain access to the car park.

It is proposed to make St. Nicholas' Car Park free for all vehicles up to a three-hour time limit. This is to encourage medium - long stay parking in the town centre. Public realm improvements are also proposed for Chapel Lane, providing an enhanced pedestrian linkage between the car park and Main Street. Wayfinding is also proposed to encourage use of the car park.

9.1.3 Strand Lane / Oven Lane Car Park

Strand Lane will maintain its existing 23 car parking spaces, two of which will be for electric vehicle charging. The car park will be included in the public realm upgrades, with new surfaces and an improved linkage to Main Street via Oven Lane. Oven Lane (between Main Street and Strand Lane car park) will also be subject to public realm improvements, including lighting which will improve pedestrian comfort while walking between the two.

Oven Lane (between Strand Lane car park and the Quays) will also be part of the public realm enhancements. It is proposed to formalise parking in this area, providing 10 car parking spaces. These will serve Main Street, but will also provide future parking for activities and places on the Quays.

9.1.4 Summary Proposed Changes to Car Parking

The assessment of parking capacity within Carrick-on-Suir confirms that the changes to the parking proposed in the Carrick-on-Suir Regeneration Project will not result in an overall negative impact on the availability of car parking within a five minute walk of Main Street, Carrick-on-Suir.

The car parking capacity at Healy Park will significantly increase, provide vehicle accessibility to the amenity area of Healy Park and the Suir Blueway.



Appendix 1

JUNCTIONS OSCADY Analysis

Junctions 9
OSCADY 9 - Signalised Intersection Module
Version: 9.5.1.7462 © Copyright TRL Limited, 2019
For sales and distribution information, program advice and maintenance, contact TRL: +44 (0)1344 379777 software@trl.co.uk www.trlsoftware.co.uk
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: Main Street Oscady.j9
 Path: C:\Users\kconcanon\Desktop\Junctions
 Report generation date: 14/07/2021 10:52:14

- »Carrick-on-Suir Main Street_Dillion Bridge - 2023, AM
- »Carrick-on-Suir Main Street_Dillion Bridge - 2023, PM
- »Carrick-on-Suir Main Street_Dillion Bridge - 2023, Midday
- »Carrick-on-Suir Main Street_Dillion Bridge - 2028, AM
- »Carrick-on-Suir Main Street_Dillion Bridge - 2028, PM
- »Carrick-on-Suir Main Street_Dillion Bridge - 2028, Midday
- »Carrick-on-Suir Main Street_Dillion Bridge - 2038, AM
- »Carrick-on-Suir Main Street_Dillion Bridge - 2038, PM
- »Carrick-on-Suir Main Street_Dillion Bridge - 2038, Midday

Summary of junction performance

	AM					PM					Midday				
	Set ID	Queue (Veh)	Delay (s)	DOS	LOS	Set ID	Queue (Veh)	Delay (s)	DOS	LOS	Set ID	Queue (Veh)	Delay (s)	DOS	LOS
Carrick-on-Suir Main Street_Dillion Bridge - 2023															
Arm A	D1	5.7	23.01	0.36	C	D2	6.4	24.36	0.36	C	D3	5.5	25.22	0.33	C
Arm B		15.8	58.06	0.96	E		11.1	39.28	0.86	D		6.5	25.63	0.60	C
Arm C		0.0	0.00	0.00	A		0.0	0.00	0.00	A		0.0	0.00	0.00	A
Carrick-on-Suir Main Street_Dillion Bridge - 2028															
Arm A	D4	5.8	23.06	0.36	C	D5	6.5	24.41	0.36	C	D6	5.5	25.26	0.33	C
Arm B		16.6	61.98	0.97	E		11.4	40.21	0.86	D		6.6	25.83	0.60	C
Arm C		0.0	0.00	0.00	A		0.0	0.00	0.00	A		0.0	0.00	0.00	A
Carrick-on-Suir Main Street_Dillion Bridge - 2038															
Arm A	D7	5.8	23.07	0.36	C	D8	6.5	24.41	0.36	C	D9	5.5	25.26	0.33	C
Arm B		16.7	62.31	0.97	E		11.4	40.28	0.87	D		6.6	25.84	0.61	C
Arm C		0.0	0.00	0.00	A		0.0	0.00	0.00	A		0.0	0.00	0.00	A

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

File summary

File Description

Title	
Location	
Site number	
Date	18/05/2021
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	MWP\kconcanon
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perTimeSegment	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	DOS Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)
D1	2023	AM	DIRECT	08:05	09:20	75	15
D2	2023	PM	DIRECT	16:45	18:00	75	15
D3	2023	Midday	DIRECT	13:00	14:00	60	15
D4	2028	AM	DIRECT	08:05	09:20	75	15
D5	2028	PM	DIRECT	16:45	18:00	75	15
D6	2028	Midday	DIRECT	13:00	14:00	60	15
D7	2038	AM	DIRECT	08:05	09:20	75	15
D8	2038	PM	DIRECT	16:45	18:00	75	15
D9	2038	Midday	DIRECT	13:00	14:00	60	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Carrick-on-Suir Main Street_Dillion Bridge	100.000

Carrick-on-Suir Main Street_Dillion Bridge - 2023, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	Signalised		47.16	D

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
A	Castle Lane	
B	Dillion Bridge	
C	Main Street	

OSCADY Traffic Streams

Arm	Traffic Stream	Phase	Destination arms	Straight move
A	1	B	B	C
	2	A	C	C
B	1	B	C	
C	1	A	A	A

OSCADY Lanes

Arm	Traffic Stream	Destination arms	Gradient (%)	Width (m)	Turning radius (m)	Nearside lane	Has bay
A	1	B	0	3.00	10.00	✓	
	2	C	0	3.00		✓	
B	1	C	0	3.00	10.00	✓	
C	1	A	0	3.00		✓	

Signal Timings

Junction 1

Junction	Sequence to use	Cycle time (s)	Maximum cycle time (s)	Start displacement (s)	End displacement (s)
1	1	90	300	1.40	2.90

Optimisation options

Junction	Optimise stage lengths	Optimise cycle time	Optimiser demand source	Optimiser message
1			Average	(Optimiser not used)

Phases

Junction	Phase	Name	Minimum green (s)
1	A		7
	B		7

Library Stages

Junction	Library Stage	Phases in stage	User stage minimum (s)	Run every N cycles	Probability of running (%)
1	1	A	1		
	2	B	1		
	3		1		

Stage Sequences

Junction	Sequence	Name	Stage IDs	Stage ends
1	1		1, 2, 3	20, 60, 0

Intergreen Matrix for Junction 1

		To	
		A	B
From	A		5
	B	5	

Interstage Matrix for Junction 1

		To		
		1	2	3
From	1	0	5	0
	2	5	0	0
	3	0	0	0

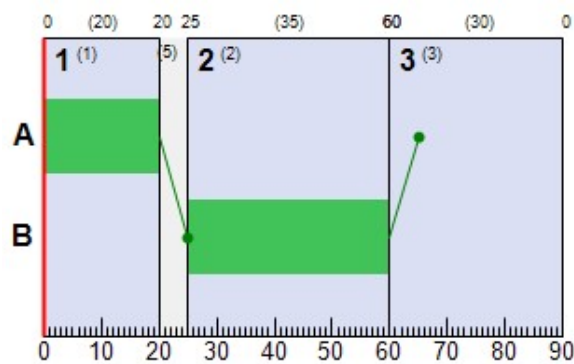
Resultant Stages

Junction	Resultant Stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	1	1	A	0	20	20	1	7
	2	2	B	25	60	35	1	7
	3	3		60	0	30	1	1

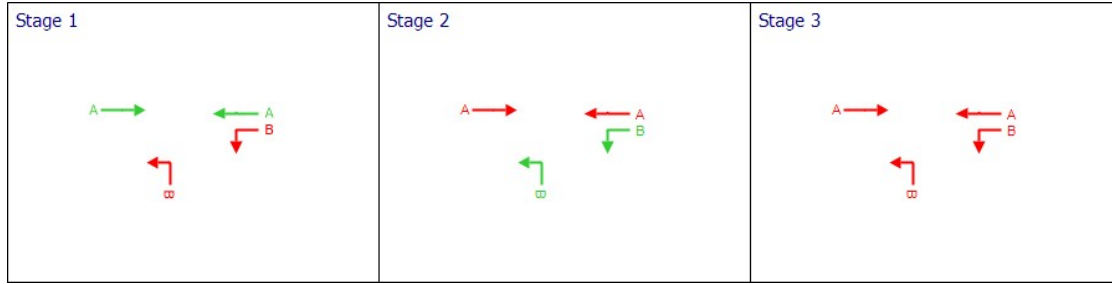
Resultant Phase Green Periods

Junction	Phase	Green period	Start time (s)	End time (s)	Duration (s)
1	A	1	0	20	20
	B	1	25	60	35

Phase Timings Diagram for Junction 1



Stage Sequence Diagram for Junction 1



Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)
D1	2023	AM	DIRECT	08:05	09:20	75	15

Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
A		✓	100.000
B		✓	100.000
C		✓	100.000

Origin-Destination Data

Demand (Veh/TS)

		To			
		A	B	C	
08:05 - 08:20	From	A	0.00	38.00	9.00
		B	0.00	0.00	112.00
		C	0.00	0.00	0.00

Demand (Veh/TS)

		To			
		A	B	C	
08:20 - 08:35	From	A	0.00	35.00	14.00
		B	0.00	0.00	160.00
		C	0.00	0.00	0.00

Demand (Veh/TS)

		To			
		A	B	C	
08:35 - 08:50	From	A	0.00	30.00	17.00
		B	0.00	0.00	150.00
		C	0.00	0.00	0.00

Demand (Veh/TS)

		To			
		A	B	C	
08:50 - 09:05	From	A	0.00	50.00	25.00
		B	0.00	0.00	106.00
		C	0.00	0.00	0.00

Demand (Veh/TS)

09:05 - 09:20

		To		
		A	B	C
From	A	0.00	60.00	26.00
	B	0.00	0.00	146.00
	C	0.00	0.00	0.00

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	1	1
	B	0	1	1
	C	0	0	0

Results

Results Summary for whole modelled period

Arm	Max DOS	Max Delay (s)	Max Queue (Veh)	Max LOS
A	0.36	23.01	5.7	C
B	0.96	58.06	15.8	E
C	0.00	0.00	0.0	A

Main Results for each time segment
08:05 - 08:20

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	38.00	412.18	36.50	0.00	167.16	0.227	35.70	2.3	18.462	B
	2	9.00	474.01	21.50	0.00	113.24	0.079	8.31	0.7	26.984	C
B	1	112.00	412.18	36.50	0.00	167.16	0.670	104.55	7.5	28.040	C
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

08:20 - 08:35

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	35.00	412.18	36.50	0.00	167.16	0.209	35.19	2.1	18.234	B
	2	14.00	474.01	21.50	0.00	113.24	0.124	13.61	1.1	27.532	C
B	1	160.00	412.18	36.50	0.00	167.16	0.957	151.61	15.8	53.713	D
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

08:35 - 08:50

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	30.00	412.18	36.50	0.00	167.16	0.179	30.31	1.8	17.858	B
	2	17.00	474.01	21.50	0.00	113.24	0.150	16.77	1.3	27.878	C
B	1	150.00	412.18	36.50	0.00	167.16	0.897	151.44	14.4	58.062	E
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

08:50 - 09:05

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	50.00	412.18	36.50	0.00	167.16	0.299	48.76	3.0	19.466	B
	2	25.00	474.01	21.50	0.00	113.24	0.221	24.37	1.9	28.863	C
B	1	106.00	412.18	36.50	0.00	167.16	0.634	113.43	7.0	28.836	C
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

09:05 - 09:20

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	60.00	412.18	36.50	0.00	167.16	0.359	59.36	3.7	20.408	C
	2	26.00	474.01	21.50	0.00	113.24	0.230	25.92	2.0	29.000	C
B	1	146.00	412.18	36.50	0.00	167.16	0.873	141.26	11.7	41.427	D
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

Carrick-on-Suir Main Street_Dillion Bridge - 2023, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	Signalised		32.90	C

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)
D2	2023	PM	DIRECT	16:45	18:00	75	15

Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
A		✓	100.000
B		✓	100.000
C		✓	100.000

Origin-Destination Data

Demand (Veh/TS)

16:45 - 17:00

		To		
		A	B	C
From	A	0.00	40.00	37.00
	B	0.00	0.00	143.00
	C	0.00	0.00	0.00

Demand (Veh/TS)

17:00 - 17:15

		To		
		A	B	C
From	A	0.00	47.00	30.00
	B	0.00	0.00	106.00
	C	0.00	0.00	0.00

Demand (Veh/TS)

17:15 - 17:30

		To		
		A	B	C
From	A	0.00	57.00	37.00
	B	0.00	0.00	87.00
	C	0.00	0.00	0.00

Demand (Veh/TS)

17:30 - 17:45

		To		
		A	B	C
From	A	0.00	60.00	34.00
	B	0.00	0.00	135.00
	C	0.00	0.00	0.00

Demand (Veh/TS)

17:45 - 18:00

		To		
		A	B	C
From	A	0.00	58.00	34.00
	B	0.00	0.00	110.00
	C	0.00	0.00	0.00

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	1	1
	B	0	1	1
	C	0	0	0

Results

Results Summary for whole modelled period

Arm	Max DOS	Max Delay (s)	Max Queue (Veh)	Max LOS
A	0.36	24.36	6.4	C
B	0.86	39.28	11.1	D
C	0.00	0.00	0.0	A

Main Results for each time segment

16:45 - 17:00

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	40.00	412.18	36.50	0.00	167.16	0.239	37.58	2.4	18.621	B
	2	37.00	474.01	21.50	0.00	113.24	0.327	34.09	2.9	30.561	C
B	1	143.00	412.18	36.50	0.00	167.16	0.855	131.86	11.1	39.285	D
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

17:00 - 17:15

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	47.00	412.18	36.50	0.00	167.16	0.281	46.56	2.9	19.207	B
	2	30.00	474.01	21.50	0.00	113.24	0.265	30.57	2.3	29.561	C
B	1	106.00	412.18	36.50	0.00	167.16	0.634	110.16	7.0	27.489	C
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

17:15 - 17:30

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	57.00	412.18	36.50	0.00	167.16	0.341	56.37	3.5	20.115	C
	2	37.00	474.01	21.50	0.00	113.24	0.327	36.43	2.9	30.571	C
B	1	87.00	412.18	36.50	0.00	167.16	0.520	88.46	5.5	23.743	C
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

17:30 - 17:45

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	60.00	412.18	36.50	0.00	167.16	0.359	59.81	3.7	20.414	C
	2	34.00	474.01	21.50	0.00	113.24	0.300	34.25	2.7	30.138	C
B	1	135.00	412.18	36.50	0.00	167.16	0.808	130.62	9.9	35.341	D
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

17:45 - 18:00

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	58.00	412.18	36.50	0.00	167.16	0.347	58.13	3.6	20.225	C
	2	34.00	474.01	21.50	0.00	113.24	0.300	34.00	2.7	30.129	C
B	1	110.00	412.18	36.50	0.00	167.16	0.658	112.58	7.3	28.264	C
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

Carrick-on-Suir Main Street_Dillion Bridge - 2023, Midday

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	Signalised		25.45	C

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)
D3	2023	Midday	DIRECT	13:00	14:00	60	15

Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
A		✓	100.000
B		✓	100.000
C		✓	100.000

Origin-Destination Data

Demand (Veh/TS)

13:00 - 13:15

		To		
		A	B	C
From	A	0.00	46.00	34.00
	B	0.00	0.00	100.00
	C	0.00	0.00	0.00

Demand (Veh/TS)

13:15 - 13:30

		To		
		A	B	C
From	A	0.00	43.00	23.00
	B	0.00	0.00	85.00
	C	0.00	0.00	0.00

Demand (Veh/TS)

13:30 - 13:45

		To		
		A	B	C
From	A	0.00	35.00	37.00
	B	0.00	0.00	72.00
	C	0.00	0.00	0.00

Demand (Veh/TS)

13:45 - 14:00

		To		
		A	B	C
From	A	0.00	26.00	37.00
	B	0.00	0.00	89.00
	C	0.00	0.00	0.00

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	1	1
	B	0	1	1
	C	0	0	0

Results

Results Summary for whole modelled period

Arm	Max DOS	Max Delay (s)	Max Queue (Veh)	Max LOS
A	0.33	25.22	5.5	C
B	0.60	25.63	6.5	C
C	0.00	0.00	0.0	A

Main Results for each time segment

13:00 - 13:15

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	46.00	412.18	36.50	0.00	167.16	0.275	43.20	2.8	19.117	B
	2	34.00	474.01	21.50	0.00	113.24	0.300	31.34	2.7	30.106	C
B	1	100.00	412.18	36.50	0.00	167.16	0.598	93.53	6.5	25.635	C
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

13:15 - 13:30

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	43.00	412.18	36.50	0.00	167.16	0.257	43.19	2.6	18.874	B
	2	23.00	474.01	21.50	0.00	113.24	0.203	23.88	1.8	28.621	C
B	1	85.00	412.18	36.50	0.00	167.16	0.508	86.10	5.4	23.437	C
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

13:30 - 13:45

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	35.00	412.18	36.50	0.00	167.16	0.209	35.50	2.1	18.235	B
	2	37.00	474.01	21.50	0.00	113.24	0.327	35.87	2.9	30.565	C
B	1	72.00	412.18	36.50	0.00	167.16	0.431	72.89	4.5	21.741	C
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

13:45 - 14:00

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	26.00	412.18	36.50	0.00	167.16	0.156	26.55	1.6	17.569	B
	2	37.00	474.01	21.50	0.00	113.24	0.327	37.00	2.9	30.590	C
B	1	89.00	412.18	36.50	0.00	167.16	0.532	87.83	5.6	23.894	C
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

Carrick-on-Suir Main Street_Dillion Bridge - 2028, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	Signalised		49.88	D

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)
D4	2028	AM	DIRECT	08:05	09:20	75	15

Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
A		✓	101.078
B		✓	101.078
C		✓	101.078

Origin-Destination Data

Demand (Veh/TS)

08:05 - 08:20

		To		
		A	B	C
From	A	0.00	38.00	9.00
	B	0.00	0.00	112.00
	C	0.00	0.00	0.00

Demand (Veh/TS)

08:20 - 08:35

		To		
		A	B	C
From	A	0.00	35.00	14.00
	B	0.00	0.00	160.00
	C	0.00	0.00	0.00

Demand (Veh/TS)

08:35 - 08:50

		To		
		A	B	C
From	A	0.00	30.00	17.00
	B	0.00	0.00	150.00
	C	0.00	0.00	0.00

Demand (Veh/TS)

08:50 - 09:05

		To		
		A	B	C
From	A	0.00	50.00	25.00
	B	0.00	0.00	106.00
	C	0.00	0.00	0.00

Demand (Veh/TS)

09:05 - 09:20

		To		
		A	B	C
From	A	0.00	60.00	26.00
	B	0.00	0.00	146.00
	C	0.00	0.00	0.00

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	1	1
	B	0	1	1
	C	0	0	0

Results

Results Summary for whole modelled period

Arm	Max DOS	Max Delay (s)	Max Queue (Veh)	Max LOS
A	0.36	23.06	5.8	C
B	0.97	61.98	16.6	E
C	0.00	0.00	0.0	A

Main Results for each time segment

08:05 - 08:20

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	38.41	412.18	36.50	0.00	167.16	0.230	36.09	2.3	18.494	B
	2	9.10	474.01	21.50	0.00	113.24	0.080	8.40	0.7	26.994	C
B	1	113.21	412.18	36.50	0.00	167.16	0.677	105.65	7.6	28.318	C
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

08:20 - 08:35

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	35.38	412.18	36.50	0.00	167.16	0.212	35.56	2.1	18.263	B
	2	14.15	474.01	21.50	0.00	113.24	0.125	13.76	1.1	27.550	C
B	1	161.72	412.18	36.50	0.00	167.16	0.967	152.68	16.6	55.727	E
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

08:35 - 08:50

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	30.32	412.18	36.50	0.00	167.16	0.181	30.63	1.8	17.882	B
	2	17.18	474.01	21.50	0.00	113.24	0.152	16.95	1.3	27.900	C
B	1	151.62	412.18	36.50	0.00	167.16	0.907	152.97	15.3	61.983	E
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

08:50 - 09:05

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	50.54	412.18	36.50	0.00	167.16	0.302	49.28	3.1	19.514	B
	2	25.27	474.01	21.50	0.00	113.24	0.223	24.63	2.0	28.898	C
B	1	107.14	412.18	36.50	0.00	167.16	0.641	115.32	7.1	29.636	C
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

09:05 - 09:20

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	60.65	412.18	36.50	0.00	167.16	0.363	60.00	3.7	20.472	C
	2	26.28	474.01	21.50	0.00	113.24	0.232	26.20	2.0	29.037	C
B	1	147.57	412.18	36.50	0.00	167.16	0.883	142.60	12.1	42.515	D
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

Carrick-on-Suir Main Street_Dillion Bridge - 2028, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	Signalised		33.45	C

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)
D5	2028	PM	DIRECT	16:45	18:00	75	15

Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
A		✓	101.078
B		✓	101.078
C		✓	101.078

Origin-Destination Data

Demand (Veh/TS)

16:45 - 17:00

		To		
		A	B	C
From	A	0.00	40.00	37.00
	B	0.00	0.00	143.00
	C	0.00	0.00	0.00

Demand (Veh/TS)

17:00 - 17:15

		To		
		A	B	C
From	A	0.00	47.00	30.00
	B	0.00	0.00	106.00
	C	0.00	0.00	0.00

Demand (Veh/TS)

17:15 - 17:30

		To		
		A	B	C
From	A	0.00	57.00	37.00
	B	0.00	0.00	87.00
	C	0.00	0.00	0.00

Demand (Veh/TS)

17:30 - 17:45

		To		
		A	B	C
From	A	0.00	60.00	34.00
	B	0.00	0.00	135.00
	C	0.00	0.00	0.00

Demand (Veh/TS)

17:45 - 18:00

		To		
		A	B	C
From	A	0.00	58.00	34.00
	B	0.00	0.00	110.00
	C	0.00	0.00	0.00

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	1	1
	B	0	1	1
	C	0	0	0

Results

Results Summary for whole modelled period

Arm	Max DOS	Max Delay (s)	Max Queue (Veh)	Max LOS
A	0.36	24.41	6.5	C
B	0.86	40.21	11.4	D
C	0.00	0.00	0.0	A

Main Results for each time segment

16:45 - 17:00

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	40.43	412.18	36.50	0.00	167.16	0.242	37.98	2.4	18.656	B
	2	37.40	474.01	21.50	0.00	113.24	0.330	34.46	2.9	30.623	C
B	1	144.54	412.18	36.50	0.00	167.16	0.865	133.12	11.4	40.206	D
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

17:00 - 17:15

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	47.51	412.18	36.50	0.00	167.16	0.284	47.06	2.9	19.251	B
	2	30.32	474.01	21.50	0.00	113.24	0.268	30.90	2.4	29.607	C
B	1	107.14	412.18	36.50	0.00	167.16	0.641	111.49	7.1	27.802	C
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

17:15 - 17:30

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	57.61	412.18	36.50	0.00	167.16	0.345	56.97	3.5	20.174	C
	2	37.40	474.01	21.50	0.00	113.24	0.330	36.82	2.9	30.633	C
B	1	87.94	412.18	36.50	0.00	167.16	0.526	89.43	5.6	23.886	C
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

17:30 - 17:45

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	60.65	412.18	36.50	0.00	167.16	0.363	60.45	3.7	20.479	C
	2	34.37	474.01	21.50	0.00	113.24	0.304	34.61	2.7	30.194	C
B	1	136.46	412.18	36.50	0.00	167.16	0.816	131.94	10.1	35.998	D
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A

17:45 - 18:00

Arm	Traffic Stream	Total Demand (Veh/TS)	Calculated saturation flow (Veh/TS)	Effective green time (s)	NEEG (s)	Capacity (Veh/TS)	DOS	Throughput (Veh/TS)	End queue (Veh)	Delay (s)	Signalised level of service
A	1	58.63	412.18	36.50	0.00	167.16	0.351	58.75	3.6	20.286	C
	2	34.37	474.01	21.50	0.00	113.24	0.304	34.37	2.7	30.184	C
B	1	111.19	412.18	36.50	0.00	167.16	0.665	113.86	7.4	28.585	C
C	1	0.00	478.75	21.50	0.00	114.37	0.000	0.00	0.0	0.000	A